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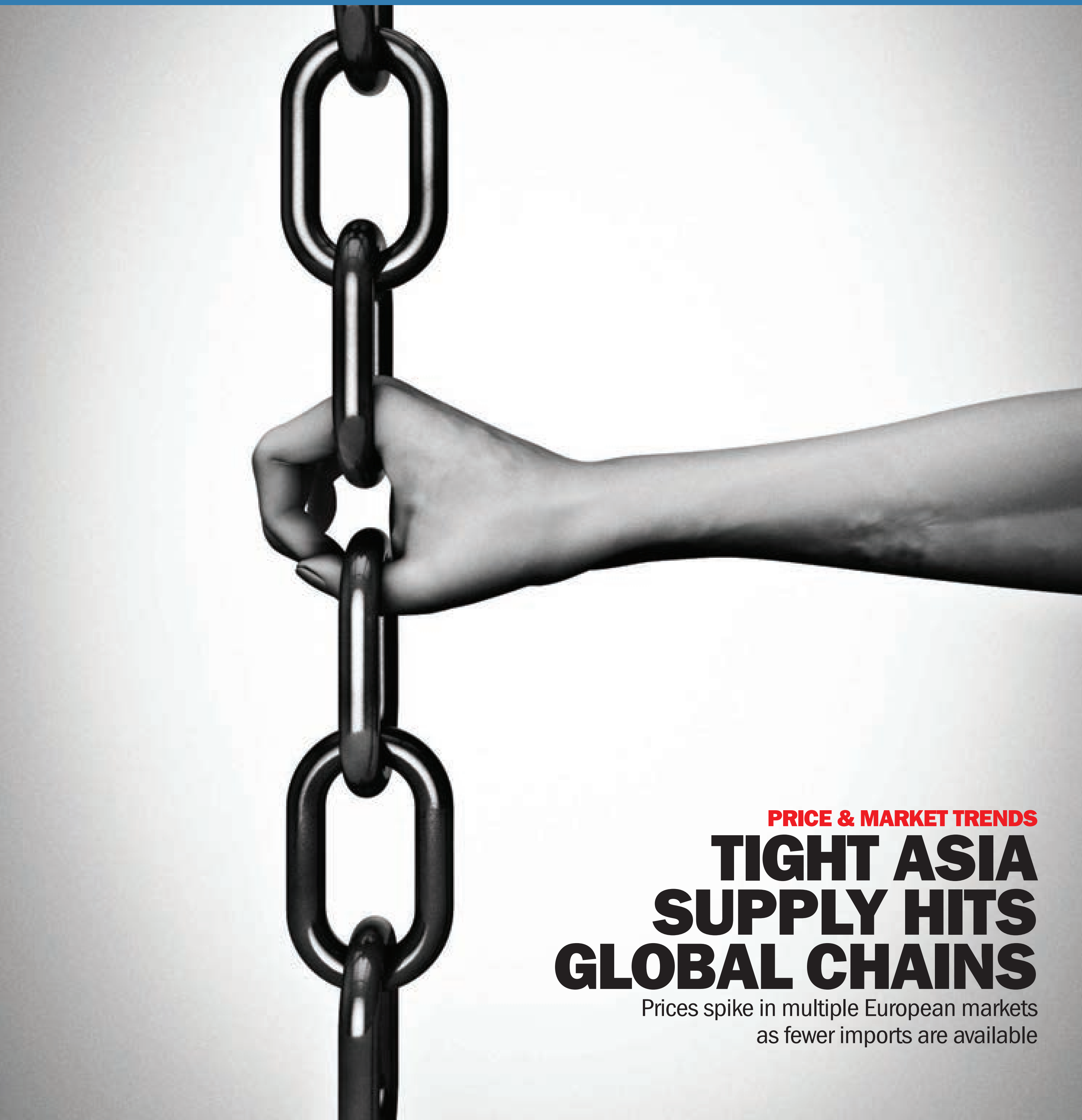
10-16 February 2017

ICIS Chemical Business

MAKING SENSE OF CHEMICAL PRICES



PRICE & MARKET TRENDS

TIGHT ASIA SUPPLY HITS GLOBAL CHAINS

Prices spike in multiple European markets as fewer imports are available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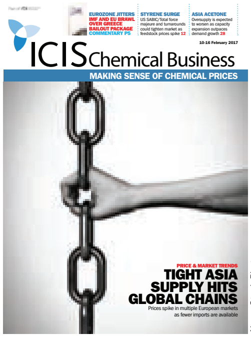
VOLUME 291 NUMBER 6 **10-16 FEBRUARY 2017**



Alamy Stock Photo

COVER STORY

Tightness of supply in Asia is crimping exports to other regions and pushing prices upwards along regional supply chains

For the full story see P14

Phenol prices are soaring to 21-month highs in India as supply tightens P9

Europe polypropylene buyers face increases as prices are flying high on strong demand P20. Portfolio sustainability assessment could become an important tool P22

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WILL BEACHAM BARCELONA

Greece stirs eurozone

Markets are nervous, and bond yields rising, as there is no agreement yet over conditions for future bailout payments. Unease over elections in France, Germany and The Netherlands

The eurozone may be lurching towards another crisis of confidence as Greece edges closer, once again, to a confrontation over progress towards austerity measures which are a condition of the current bailout agreed in 2015.

Chemical industry executives will not welcome any deterioration in confidence in Europe where purchasing manager indexes have shown nascent signs of improvement in recent months.

Disagreements between Greece's international creditors, the eurozone and the International Monetary Fund, have emerged over the state of the country's economy and the future approach to servicing of the debt. Greece needs a new injection of funds from the existing €86bn bailout by the third quarter of 2017 or it risks defaulting on its debts. This would likely lead to the country exiting the euro though it could remain in the EU.

As the Greece issue rumbles on, other threats to the euro and EU are rearing their heads

On Monday, 6 February, divisions within the IMF itself boiled over into the public domain when it emerged that EU countries had challenged IMF forecasts for Greek economic growth. Brussels argues that the IMF is being too pessimistic in its forecasts which suggest that Greek debt – without relief – will spiral out of control after 2022 as economic growth will not support the burden. Without agreement between the EU and IMF, it may be impossible to agree the terms of any future bailout.

There is a meeting of eurozone finance ministers on 20 February where markets will be expecting some signs of progress towards an agreement on the bailout package. Greece, on the other hand, has said it will not accept harsh austerity measures as part of any future package, arguing it has made substantial progress.

WestEnd61/REX/Shutterstock

Greece needs agreement over future bailout conditions

Interest rates on government bonds have spiked to over 10%, the highest level since June 2016, as investors worry about the country's ability to service debt. Greece has lost 25% of its GDP since the financial crisis of 2008 and has a €330bn debt burden.

As the Greece issue rumbles on, other threats to the euro and EU are rearing their heads. France holds presidential elections on 24 April 2017. Far-right party the National Front has been gaining popularity and has promised to renegotiate the country's relationship with the EU. Candidate Marine Le Pen – which polls give around 25% support – will also hold a referendum on EU membership. Meanwhile, The Netherlands goes to the polls on March 15 with one anti-establishment candidate pledging to scrap the euro and reintroduce border checks. In Germany, Angela Merkel hopes to be re-elected as German chancellor in September. ■

JOSEPH CHANG NEW YORK

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ICIS Chemical Business has gone all digital. But have you been to our new website? Check out **www.icis.com/subscriber/icb** for all the latest news and analysis from ICB.

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BRIEFING

AMERICAS

PHILLIPS 66 MOVES DATE FOR US GULF PROJECT

Chevron Phillips Chemical's ethane cracker project in Texas is expected to be complete in Q4 2017, as indicated on Phillips 66's Q4 2016 conference call. The company noted that two polyethylene (PE) derivative units in the Gulf Coast are on their mid-year target and in the commissioning phases, although the ethane cracker likely will not come online until Q1 2018. "The 3.3bn lbs/year (1.5m tonnes/year) ethane plant was expected to come online in the second half of this year," Phillips 66 said.

AFPM APPLAUDS APPROVAL FOR DAKOTA ACCESS

US trade group American Fuel & Petrochemical Manufacturers (AFPM) is applauding the Trump administration's final approval of the Dakota Access oil pipeline project, reacting to news that the US Army Corps of Engineers will grant the final easement to complete the project. "We applaud the Trump administration's swift actions to approve the Dakota Access pipeline," said Chet Thompson, AFPM's CEO. Dakota Access is a 1,172-mile underground 30" pipeline extending from the Bakken/Three Forks production area in North Dakota to Patoka, Illinois.

BRAZIL CHEMICALS SEE VOLUME GROWTH IN 2016

Despite a sluggish start to 2016, Brazil's chemical sector ended on a relative high note, according to figures released on 6 February by trade group Abiquim. Abiquim said the sector benefitted from a more stable economic and political climate, a lower benchmark interest rate and slowing inflation. Production of industrial chemicals for the whole year rose by 4.0% compared with 2015, while domestic sales were up by 3.9%.

CHEMICAL TANKER ARRIVALS IN HOUSTON JUMP 35%

January chemical tanker arrivals jumped by 35%, the biggest percentage increase of any vessel sector and sizably larger than the gain for all sectors during the month. The number of chemical tankers arriving in Houston during January totaled 41 more than in the same month of 2016 and 37 more than in December last year, according to data from the Greater Houston Port Bureau (GHPB). Arrivals for two other vessel sectors increased, with containers up 6.8% and liquefied petroleum gas (LPG) up 5.3%.

Gary K Smith/FLPA/imageBROKER/REX/Shutterstock

PIC OF THE WEEK

US trade deficit largest since 2012

The US Commerce Department says that the country's 2016 trade deficit was $502.25bn, the biggest in four years, led by $347bn with China, $69bn with Japan, and $65bn with Germany.

US, CANADA OIL AND GAS RIG COUNT RISES

The average rig count in the US and Canadian oil and gas industries for January was up from December, and it rose year on year from January 2016, US oil services major Baker Hughes said. The average US rig count for January was 683 – up from 634 in December, and up from 654 in January 2016. The average Canadian rig count for January was 302 – up from 209 in December, and up from 192 in January 2016.

BRAZIL'S OXITENO CREATES US OFFICE, APPOINTS COO

Brazil-based Oxiteno has appointed Timothy Earl Madden as Chief Operating Officer (COO) of its US branch. Oxiteno CEO Joao Parolin said the company needed to put in place "a senior-level leader to allow for faster decision-making and to consolidate all the investments we are making into a unified effort". The company also opened a new commercial office in Houston, Texas, and announced the construction of an alkoxylation plant just outside Houston with a planned production capacity of 170,000 tons/year (154,221 tonnes/year).

AFPM APPOINTS MCARVER, THOREN TO NEW POSITIONS

The American Fuel & Petrochemical Manufacturers (AFPM) has appointed Robert McArver as vice president (VP) of petrochemicals and promoted Don Thoren to VP of state and local outreach, the trade association announced. AFPM CEO Chet Thompson said that Thoren, who joined AFPM in 2016 as director of outreach, had "excelled in building strong coalitions and alliances with both consumers and stakeholders". McArver most recently served as the VP of policy and government relations for the Association of Home Appliance Manufacturers.

DOW TO CONDUCT MAINTENANCE ON PIPELINE

Dow Chemical will conduct planned maintenance on a propylene pipeline at its Freeport operations in Texas, US, according to a government filing. Emissions are expected on 6-10 February as the pipeline is cleared for maintenance, the company said in the initial report with the Texas Commission on Environmental Quality (TCEQ). Operations and production units within the unit will continue as normal, the company said.

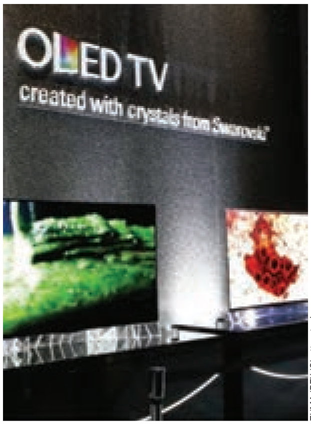
LINCOLN CHURCHILL AND STREETSMART MERGE

US-based companies Lincoln Churchill Advisors and StreetSmart Strategies have joined forces to create a leading full-service investor relations (IR), and corporate and crisis communications firm. Lincoln Churchill Advisors is led by communications veterans Nathan Elwell and Chris Kettmann while StreetSmart Strategies is led by former Wall Street specialty chemicals and materials analyst Tim Gerdeman, who at StreetSmart provides publicly traded corporations with C-suite level outsourced investor relations services. The firm will operate under the Lincoln Churchill Advisors, and remain headquartered in Evanston, Illinois, US.

EUROPE

GERMAN ALZCHEM POSTPONES IPO

AlzChem is postponing its planned initial public offering (IPO) as "political issues" are causing persistent uncertainty for new investments, the Germany-based manufacturer of chemical products based on the nitrogen-carbon-nitrogen (NCN) chain



ZUMA/REX/Shutterstock

BASF buys OLED maker Rolic

says. The company was planning to raise about €40m-50m in the IPO, with most of the proceeds to be invested in a new plant for a specialty chemical at its base in Trostberg, Bavaria. Trading of AlzChem shares was initially planned to begin on Friday, 10 February, in Frankfurt.

MOL ENCOURAGES CROATIA BID FOR INA STAKE

Hungary's MOL on 6 February reiterated that it remains open to an offer for its 49.08% stake in Croatia's INA after the Hungarian foreign minister reportedly described further business cooperation between the group and the Croatian refiner as "politically untenable". In an interview with Hungarian business news weekly Figyelo published on 3 February the foreign affairs minister, Peter Szijjarto, added that Hungary had "made it clear that a transaction will only be acceptable if the amount of money returned to Hungary equals MOL's full invested capital".

HUNTSMAN DECLARES FM ON PRODUCT FROM PORI

Huntsman has declared force majeure on product from its Pori, Finland, site, a company spokesperson said on 8 February, following a fire occurred the previous week. The company began to notify customers of the force majeure at the end of the previous week, the spokesperson said, following a fire at the facility's titanium dioxide (TiO2) unit. "The FM [force majeure] is on products from the Pori site," a company spokesperson said.

BASF ACQUIRES SWISS LCD/ OLED PRODUCER

BASF has acquired Swiss producer of liquid crystal displays (LCD) and organic light-emitting diodes (OLED) for advanced displays Rolic AG for an undisclosed amount, the German chemical major said on 8 February. Headquartered in Allschwil, Switzerland, Rolic employs 110 and has subsidiaries in The Netherlands and China, both of which will also go under BASF's umbrella

KEMIRA Q4 NET PROFIT SURGES

Kemira's net profit surged to €18.2m in the fourth quarter of last year from €4.4m in the same period of 2015 despite facing challenging oil and gas markets, the Finnish chemicals firm said on 8 February. Sales fell to €596.5m in the fourth quarter from €600m in the same period of 2015. Operative earnings before interest, tax, depreciation and amortization (EBITDA) grew by 3.0% year on year to €70m in the fourth quarter amid higher volumes and lower fixed costs.

EU ADD ON CHINESE PET REMOVED AS OF 8 FEBRUARY

The EU removed its anti-dumping duties (ADDs) on Chinese polyethylene terephthalate (PET) imported to the bloc would be removed on 8 February. The ADDs were originally scheduled to expire by 18 November 2015, but a request made on 29 June 2015 by the Committee of PET Manufacturers in Europe (CPME) prompted a review to the ADD. The Official Journal of the EU said on 7 February the decision to terminate the duties was made on Monday 6 February 2017.

MOL ON SCHEDULE FOR 2018 S-SBR LAUNCH

Hungary's MOL is on schedule to announce a 2018 launch date for its planned solution styrene butadiene rubber (S-SBR) plant, the oil, gas and petrochemicals group said on 8 February. The 60,000 tonne/year S-SBR plant is being constructed in Tiszaujvaros, Hungary, under a 49:51 joint venture with Japan-based JSR Corporation. Cost has been estimated at

VOICES FROM THE WEB

The prospect that Toshiba will withdraw from the nuclear power business after its embarrassing and expensive experience with the American company Westinghouse poses a serious problem for the UK's plans to make new nuclear the core of future energy supply. If those plans are to be delayed, as looks almost certain now, the government will have to come up with an alternative.

Financial Times – Nick Butler on UK energy policy - plan B.
■ **www.ft.com/nick-butler**

Oil giant BP saw profits double in the last three months of 2016 on the back of slightly higher oil prices and more cost-cutting.

BBC News – Business: BP profits show signs of recovery.
■ **www.bbc.co.uk/news/business**

So here's other news that I reported last month on Tecnon OrbiChem's Biomaterials newsletter, and the trend I've been noticing for the past two years or so is really the increased focus on waste-based feedstock and commercialisation of chemicals/materials out of those feedstocks. Toray Industries announced last month that it has formed a joint venture company called Cellulosic Biomass Technology Co.

Green Chemicals Blog: Toray, Mitsui in cellulosic sugar JV in Thailand.
■ **www.greenchemicalsblog.com**

China's polyethylene (PE) demand grew from around 22m tonnes in 2914 to approximately 25m tonnes in 2016 – an increase of 12.16% based on the exact numbers, according to consultants at ICIS.

John Richardson on China polyethylene.
■ **www.icis.com/blogs/asian-chemical-connections**

Check out the ICIS blogs at **icis.com/blogs**

MOST-READ

The top five stories for the week just gone:

1. **Styrene prices surge on US Gulf plant problems**
   HOUSTON – It is unclear how extended US Gulf styrene outages will impact downstream markets, but prices will be higher.
2. **Shell US cracker's construction to face 'interesting challenges'**
   LONDON – Shell's 1.5m tonne/year planned ethane cracker in Pennsylvania, US, is to face "interesting challenges".
3. **Lotte Chemical to complete four projects in 2017-2018**
   SINGAPORE – Lotte Chemical expects mechanical completion at four existing projects in 2017 and 2018.
4. **Asia benzene rebounds on tight supply; may extend gains**
   SINGAPORE – Spot benzene prices in Asia have rebounded and may continue to increase in the near term.
5. **LyondellBasell declares force majeure on PP at Brindisi, Italy**
   LONDON – LyondellBasell has declared force majeure on a natural random copolymer polypropylene (PP) grade from its Brindisi plant.

These are the most read stories taken from ICIS news last week.
To find out more visit: **icis.com/about/news**

approximately $100m by MOL's Downstream Division and feedstock for the plant is to be sourced from a 130,000 tonne/year butadiene (BD) plant officially launched at the Tiszaujvaros site in November 2015.

ARLANXEO OPENS LAB AT NETHERLANDS SITE

ARLANXEO has opened a manufacturing quality control laboratory at its Chemelot site in Geleen, Netherlands, the international synthetic rubber joint venture between Germany's LANXESS and Saudi Arabia's Saudi Aramco said on 7 February. The laboratory's staff will carry out tests on product from the company's ethylene propylene diene monomer (EPDM) plant at the site. Until now, these production quality tests were carried out externally.

UK CAR REGISTRATIONS REACH 12-YEAR HIGH

The UK new-car market achieved a 12-year high in January, according to figures published by the Society of Motor Manufacturers & Traders (SMMT) on 6 February. 174,564 new vehicles were registered last month, which is a 2.9% year-on-year uplift and the fastest start of the year since 2005, SMMT said. Across fuel types, there was a mixed picture with diesel registrations down -4.3% but new car registrations of petrol cars grew 8.9%.

BP'S Q4 PETCHEMS PROFIT NEARLY TRIPLES

BP's petrochemicals business reported a fourth-quarter 2016 underlying replacement cost (RC) profit before interest and tax of $103m, nearly triple the $36m profit recorded in the same period in 2015, amid an improved business environment for the olefins chain, the UK major said on 7 February. BP's petrochemicals production dipped by 3.3% year on year to 3.55m tonnes in the fourth quarter, and fell by 3.61% to 14.2m tonnes in 2016, compared to 2015.

ASIA

HANWHA CHEMICAL TO SHUT YEOSU TDI UNITS

South Korea's Hanwha Chemical is planning to shut two of the three 50,000 tonne/year units at its toluene di-isocyanate (TDI) plant in Yeosu from 19 March to 2 April and the third 50,000 tonne/year unit from 3-17 April for regular maintenance, a company source said. The company's monthly export volume will decline to around 30% of that in previous months in March and April. It is currently running the TDI plant at full capacity, the source added.

THAILAND'S IRPC TO SHUT PP FACILITY

Thailand's IRPC plans to shut its polypropylene (PP) production facility in Map Ta Phut for a scheduled maintenance, a source close to the company said. The shutdown is scheduled to start in mid-February, and the site is slated to remain off line for around two weeks, the source added. The site has a combined PP output of 475,000 tonnes/year.

PETRONAS RESTARTS METHANOL PLANT

Petronas Methanol Labuan Sdn Bhd's second methanol plant was restarted on 4/5 February and is in the middle of ramping up operations, a company source said. The source, however, did not mention when the facility would achieve its full operating rate. The facility has a nameplate capacity of 1.7m tonnes/year. It was shut down around 23 January due to technical issues, a company source said previously. The plant was expected to restart after 13-15 days, the source added.

AXALTA APPOINTS NEW DISTRIBUTOR FOR SE ASIA

Axalta Coating Systems has appointed Ocean Vietnam International Trading Company as its distributor for its products in Vietnam, the US-based liquid and powder coatings supplier has announced. Ocean will distribute Axalta's Alesta brand of powder coatings, Axalta said, to support its growth strategy in the Association of South East Asian Nations (ASEAN) market. Axalta noted that its Alesta brand is used in architectural, furniture, transportation and other industrial applications, and predicts that demand for those applications to grow in Vietnam and southeast Asia.

MITSUBISHI CHEMICAL NET PROFIT TRIPLES

Mitsubishi Chemical Holdings' nine-month net profit more than tripled to yen (Y) 131.8bn from Y33.8bn in the same period of the previous year amid a drop in impairment losses, the Japanese producer said. However, operating profit for the same nine months decreased by 8.2% year on year to Y210.4bn, with net sales down by 8.6% to Y2,450.6bn, the producer said in a statement.

Evonik

INNOVATION

Evonik creates digital division

Evonik has set up a new subsidiary, Evonik Digital, to develop new digital business models and build up digital expertise. A team of about 20 experts will be led by Henrik Hahn (pictured) as chief digital officer to coordinate digitalisation for the group.

ASAHI KASEI POSTS 25% PROFIT HIKE

Japanese chemical producer Asahi Kasei posted a 25% year-on-year increase in its nine-month net profit to yen (Y) 89.7bn, with significant gain on sales of investment securities and lower total income taxes. Operating profit for the nine months to 31 December 2016, however, fell by 9.9% to Y114.1bn from the same period a year earlier, while net sales declined by 6.3% to Y1,356.8bn, the company said in a statement.

MIDDLE EAST/AFRICA

JAM PETCHEM RUNS CRACKER AT 100%

Iran's Jam Petrochemical is currently operating its ethane cracker in Asaluyeh at full capacity as supply of feedstock ethane has eased from two weeks ago, a company official said. The cracker, which has a 1.32m tonne/year ethylene capacity, had operated at a reduced rate previously following a reduction in feedstock supply. For the month of February, the cracker's run rate is expected to average around 95%, compared with around 100% in January, an official said.

ZAGROS PETROCHEMICAL RESTARTS METHANOL PLANT

Zagros Petrochemical Company restarted one of its two methanol plants on 8 February, a company source said. The operating rate for that plant will be ramped up to 50-60% by 9 February as the feedstock gas shortage was partially solved, the source added. Both methanol plants were initially shut down on 3 February due to a cut in supply of feedstock natural gas by the Iranian government. Both of Zagros' methanol plants have a nameplate capacity of 1.65m tonne/year each.

Europe polymer buyers face hikes
MARKET TRENDS P20

ASIA TRISHA HUANG MELBOURNE

India phenol soars to 21-month high

Tightness in feedstocks benzene and propylene, plus high costs relative to phenol and acetone, have curtailed production

Spot phenol prices into India may extend gains after reaching a 21-month high as supply tightens up amid escalating raw material benzene prices, market participants said on 7 February.

Spot phenol prices closed at an average of $1,100/tonne CFR (cost & freight) India on 3 February, having amassed 35.8% of gains from eight consecutive weeks of run-up, according to data compiled by ICIS.

The prices were last higher in May 2015, ICIS data showed.

The bullish momentum in the CFR India phenol market has been fuelled by a combination of supply constraints, declining inventories and the renewed benzene price escalation.

Raw material benzene prices were at $1,040-1,050/tonne FOB (free on board) Korea at noon on 7 February, following an 8.4% weekly gain for the week ended 3 February, according to data compiled by ICIS.

Co-feedstock propylene prices in northeast Asia have also been strengthening as the cracker turnaround season in Asia gets under way.

Phenol stockpiles at Kandla dropped to 24,000-25,000 tonnes on 3 February from roughly 29,000 tonnes the week prior, an importer said.

A phenol production issue in South Korea and lower regional output ahead of the shutdown of PTT Phenol and Formosa Chemicals & Fibre Corp (FCFC)'s plants in early March for maintenance presage tighter forward supply.

South Korean producer Kumho P&B has had to shut down its two operational phenol/acetone units because of a mechanical problem that occurred on the evening of 2 February.

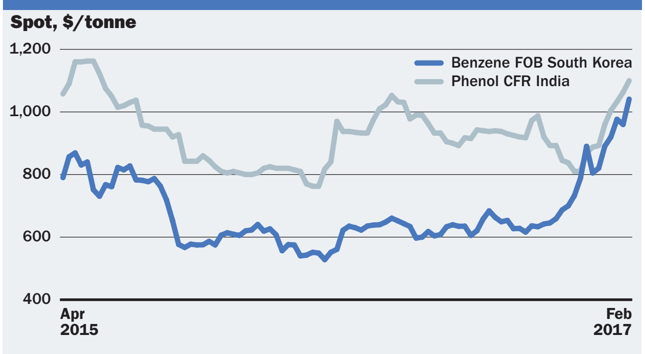
Prior to the unplanned outage, the producer had been running the plants at a reduced rate.

In southeast Asia, Mitsui Phenols Singapore has been running its phenol/acetone plant at 80% capacity since the start of 2017.

Sandra/Mailer/REX/Shutterstock

Prices in India's phenol market may fly even higher

INDIA PHENOL VERSUS SOUTH KOREA BENZENE



REGIONAL TURNAROUNDS

An ongoing tightness in raw material benzene and propylene supply, along with the high costs of the feedstock relative to phenol and acetone prices, has been an impediment to a higher production level.

Thai producer PTT Phenol's older plant will be off line from 1 March to 14 April.

Operations at its new unit "PTT Phenol II" will also be halted for 10 days in April to facilitate equipment modification.

To build up its inventories ahead of the turnaround, the producer has put its customers on allocations throughout the first quarter. Taiwanese producer FCFC's phenol/acetone plant is scheduled to undergo maintenance between early March and mid-April.

The overhaul will also result in a phenol supply shortfall to its affiliated downstream bisphenol A (BPA) maker Nan Ya Plastics. Nan Ya may need to purchase roughly 25,000 tonnes of phenol on a spot basis to fill the supply gap, market sources said.

On top of the potential demand by Nan Ya, strong margins in the downstream cyclohexanone and caprolactam sectors are sustaining additional Taiwanese buying interest for spot phenol, according to market sources.

Additionally, China-based CEPSA Chemical (Shanghai) has plans to undertake a month-long turnaround and this is likely to start in the second half of March, market sources said.

"March is set to be the tightest month in terms of phenol supply in Asia," a trader said.

On the domestic front, the rupee-denominated domestic phenol prices in India have rallied in response to the strong gains in international benzene prices and the anticipated tightening in forward phenol supply. The benchmark Kandla phenol prices settled at Indian rupees (Rs) 85-86/kg ex-tank on the evening of 6 February, up from the 3 February close of Rs80/kg ex-tank, several importers said.

ARBITAGE ENDS

Additionally, the China-to-India arbitrage may soon be closed by the strong post-Lunar New Year holiday gains in the China domestic market and the corresponding increase in the US dollar-denominated export offers.

China had sold a total of 12,000-13,000 tonnes of January- and February-loading phenol to India. Spot phenol prices in east China closed at yuan (CNY) 8,500-8,600/tonne ex-tank on 6 February, a surge of CNY900/tonne from 26 January, the final trading day before the holiday, according to data compiled by the ICIS editorial team in China.

The latest east China phenol price translates into a US dollar-denominated export parity of $1,125-1,130/tonne FOB China. At the forefront of many phenol market participants' mind is how much longer the bullish momentum in benzene prices can be sustained.

"Most people think that the benzene price uptrend will continue until at least March or April because of the persistent tightness in that market," the trader added. ■

Spotlight on demand

If a business-as-usual scenario is your base case, then you should perhaps be looking at the very real threats to demand growth rather than the additional capacity as the major challenge

NIGEL DAVIS LONDON

A debt ratings upgrade for INEOS from Moody's Investors Service on 3 February focused on what the agency called "very strong top of the cycle operating performance in 2015 and 2016". That sort of performance was reflected across much of the industry last year and in the fourth quarter as the latest slew of financial results have shown.

Top of the cycle margins suggest that there is somewhere else to go, usually down, but analysts continue to be confounded in their projections of a sharper, US shale-driven overcapacity downturn.

Dow Chemical expects a relatively flat peak for the ethylene cycle. Dow expects only a slight dip in global ethylene and PE operating rates this year as new capacities come onstream. New polyethylene (PE) capacities will be added in North America, Saudi Arabia, India and China in the short term but Dow thinks that operating rates will hold, on plant availability and modest global demand growth.

"If anything, the ethylene chain looks like it's staying where it is in terms of operating rates, if not tightening up as we move into the year," Dow president and chief operating officer Jim Fitterling said.

New PE capacities will be added in North America, Saudi Arabia, India and China

"We've already seen some tightening in Asia Pacific, and we know that things are going to balance a little bit in North America as we move through the year," he added.

A relatively tight supply side and modest global growth drives this sort of analysis. If you run the ethylene and PE numbers, the outlook is hardly encouraging. Delays to onstream dates for the new cracker and downstream facilities, however, including the coal and methanol to olefins-based capacity additions in China, change the picture.

If a business-as-usual scenario is your base case, then you should perhaps be looking at the very real threats to demand growth rather than the march of additional capacity as the major challenge over the next two to three years.

John Richardson describes some of these threats in his ICIS Asian Chemical Connections Blog post: **www.icis.com/blogs/asian-chemical-connections/2017/01/donald-trump-and-the-polyethylene-industry-what-happens-next**

INEOS ANALYSIS

Operating rates will fall this year and next as new capacities come onstream. The Moody's INEOS analysis reflects much of current thinking.

GLOBAL PE PROJECTS 2017 — '000 TONNES/YEAR

Company	Location	PE Capacity	Start-up
Sadara	Al Jubail, Saudi Arabia	LDPE: 350, LLDPE/HDPE: 750	Q4 2016/ 2017
NOVA Chemicals	Joffre, Alberta, Canada	LLDPE: 450	Dec 2016/ shipping Jan 2017
Dow Chemical	Freeport, Texas, US	ELITE PE: 400, LDPE: 750	Q2 2017
INEOS/Sasol	LaPorte, Texas, US	HDPE: 470	2017
Chevron Phillips	Sweeny, Texas, US	HDPE: 500, LLDPE: 500	mid-2017
ExxonMobil Chemical	Mont Belvieu, Texas, US	LLDPE: 650, mLLDPE: 650	mid-2017
OPaL	Dahej, India	LLDPE/HDPE: 720, HDPE: 340	H1 2017
Reliance Industries	Jamnagar, India	LLDPE/HDPE: 550, LDPE: 400	Q1 2017

CHINA PE PROJECTS 2017 — '000 TONNES/YEAR

Company	Location	PE Capacity	Start-up
Zhongtian Hechuang Energy	Inner Mongolia	CTO LDPE: 250	2017
Zhong'an Lianhe Coal Chemical	Anhui China	CTO HDPE/ LLDPE: 350	2017
Qinghai Mining, China	Qinghai, China	CTO HDPE/ LLDPE: 300	2017
Jiutai Energy	Inner Mongolia	CTO HDPE/ LLDPE: 250	2017
CNOOC Huizhou	Guangdong	Naptha-C2 HDPE & LLDPE: 400 + 300	Q4 2017
Qinghai Damei Coal Industry	Qinghai, China	CTO HDPE/ LLDPE: 300	2017
Shenhua Ningxia	Ningxia, China	CTO HDPE/ LLDPE: 430	2017

As far as INEOS is concerned, Moody's thinks the company is well positioned and doing many things right.

But its rating has been measured by the company's exposure to what it calls "weakening US margins in the next two or three years mostly due to expected new US capacity coming online from 2017".

Moody's is not alone among analysts and commentators in believing – at the very least – that current top of the cycle margins will "normalise" over the next few years. Moody's has other, lending-oriented reasons for being somewhat cautious in its outlook for the INEOS debt rating.

Looking at INEOS's operating performance, Moody's sees the company benefitting from top of the cycle con-

Do you agree or not?
We want your feedback.
Email **joseph.chang@icis.com**

ditions in its olefins and polyolefins (O&P) divisions.

Last year, INEOS Group's earnings before interest, tax, depreciation and amortisation (EBITDA) was pushed up 5.5% to €2.33bn. This was 16% higher than in 2014.

The European operations really have played their part in the cash flow increase with INEOS O&P Europe 2016 EBITDA of €709m compared to €577m for 2015.

The rating agency has to factor in the new capacity additions in the US and elsewhere in its analysis... It believes that INEOS EBITDA will fall by about 10% in 2017...

INEOS said that in Q4 olefins demand was "solid in a tight market with top of the cycle margins". Polymer demand in Europe was described as "firm in a balanced market, with solid volumes and high margins in the quarter".

It is the Europe rebound that has buoyed cash flows and profitability with the US shale derived natural gas liquids (NGLs) advantage providing the baseload. INEOS O&P Europe EBITDA had more than doubled in 2015 compared with 2014.

INEOS O&P North America reported 2016 EBITDA of €956m from €1.02bn in 2015, with cracker feedstock flexibility helping maintain margins.

"The US cracker business environment was solid with healthy margins and high operating rates throughout the quarter. Polymer demand was strong, with tight markets and high margins," INEOS said.

The INEOS Chemical Intermediates businesses reported 2016 EBITDA of €666m compared with €616m in 2015.

Moody's said that the INEOS 2016 performance had been better than it had expected – the ratings agency was looking to a 5% decline in EBITDA on new production capacity in North America, hitting O&P and new oxide capacity in the Middle East hitting performance in Chemical Intermediates.

The rating agency has to factor in the new capacity additions in the US and elsewhere in its analysis, nevertheless. It believes that INEOS EBITDA will fall by about 10% in 2017 with a shaper decline in 2018 as top of the cycle conditions in O&P "normalise".

Competitor investments in ethylene and PE capacities will create an oversupplied market and lead to margin reductions, it said.

"Both the US cash margins that are currently in the high 30s cents and the European margins of [circa] €500/tonne are expected to decline, with a more rapid and pronounced decrease expected in the US to the low 20s cents by 2018/2019," Moody's said.

The declines are not as substantial as Moody's had suggested earlier because of ethylene plant delays.

"Additionally, phenol and nitriles margins in the Chemical Intermediates division are expected to improve from the bottom of the cycle conditions they have been in for some time," the ratings agency added. ■

THINK TANK

NIGEL DAVIS LONDON

GLOBAL IPEX JUMPS 9.4% FOR JANUARY

Sharply rising petrochemical and polymer prices, largely on the back of tight availability, are reflected in a 9.4% increase in the ICIS Petrochemical Index for January.

Regional prices for January were markedly higher for methanol, butadiene, propylene, polypropylene and benzene.

The Global IPEX, at 265.35, is 33.5% higher than in January 2016 and represents the highest IPEX reading since November 2014.

Price hikes running into 2017 were most apparent in the spot price driven markets in northeast Asia but the pull of product into Asia has helped raise prices in other regions over the past four weeks.

The northeast Asia IPEX for January was up 10.1% month to month having risen by 9.2% in December. The January IPEX for northwest Europe was up 8.7% and that for the US Gulf up 8.5%.

Some prices have risen markedly over the past month but the increases in January were focused on olefins and intermediates and not necessarily on polymers. The dynamic of higher prices reverberating around the world was apparent with higher month to month price increases in northwest Europe and the US Gulf rather than in northeast Asia.

The increase in butadiene prices globally is noteworthy, driven by stronger automotive tyre demand in China and a tightness of supply in Asia that has been felt worldwide. Weather-related natural rubber production cuts have pushed natural rubber prices higher and affected synthetic rubber market sentiment.

Butadiene prices in northeast Asia were up 43.3% in January and prices were 29.8% higher in the US and 18.9% higher in northwest Europe.

A supply crunch helped lift northwest Europe methanol prices by 44.8%, according to the IPEX data. Demand has been sustained by markedly higher methanol imports into China.

US Gulf propylene prices for January climbed by 31.7% and helped to push US polypropylene prices up 19.4%.

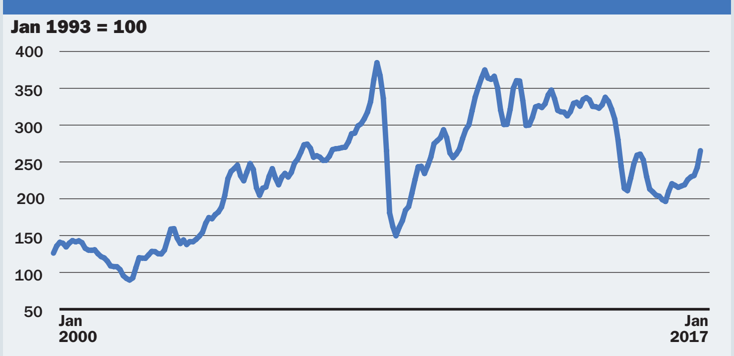
Benzene prices were up 29.2% in northwest Europe, up 15.6% on the US Gulf and 11.9% in northeast Asia. Toluene prices were much higher globally.

Price hikes running into 2017 were most apparent in the Asia spot driven markets

The IPEX represents price movements in a basket of 12 petrochemicals and plastics weighted by capacity. It is calculated each month on a regional as well as a global basis as monthly contracts and local spot prices move.

In the IPEX basket are ethylene, propylene, butadiene, benzene, toluene, paraxylene, styrene, polystyrene (PS), polyethylene (PE), polypropylene (PP), methanol and polyvinyl chloride (PVC).

GLOBAL ICIS PETROCHEMICAL INDEX (IPEX)



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ICIS

NORTH AMERICA

DAVID LOVE HOUSTON

Styrene surges on US plant problems

A SABIC/Total force majeure and upcoming turnaround could tighten the market further; feedstock prices see a spike

It is unclear how extended US Gulf styrene outages will impact downstream markets, but prices in all areas likely will be pressured higher as a result of a spike in feedstock prices.

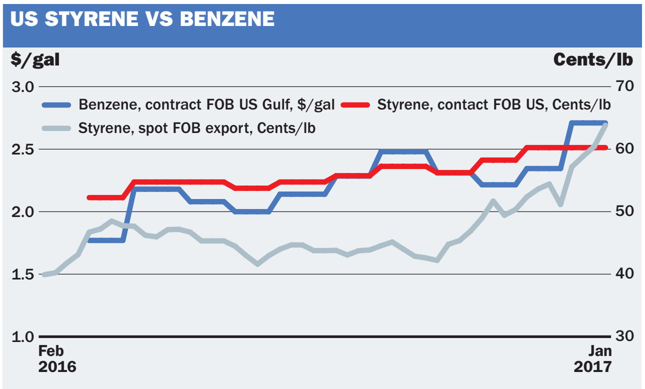
SABIC declared force majeure on 31 January on the styrene it receives from a joint venture with Total Petrochemicals at the 1.1m tonne/year Cosmar facility in Carville, Louisiana, US.

SABIC informed customers about an equipment failure that will impact the facility's capability to produce styrene until sometime this summer, the producer confirmed on 31 January.

SABIC advised customers what percentage of styrene orders they could expect to receive until full production has been restored.

Partner Total informed SABIC about the equipment failure, which it said was beyond its reasonable control. Market sources said the problem was with a superheater.

The plant is currently conducting a planned turnaround, which consists of a catalyst change on one line, the addition of a new compressor and work on the distillation tower, market sources said.



The turnaround began in the middle of January, and was supposed to be completed at the end of February, market participants said.

SABIC said that it would continue to monitor repairs at the Cosmar facility, and would keep its customers informed as the plant regains production capabilities. Additionally, the producer said that it would promptly inform customers when it has any updates.

On 30 January, Americas Styrenics (AmSty) announced in a press release that it was extending a regularly scheduled styrene unit turnaround at its St James facility in Louisiana until mid-March.

Work on the unit, which was to return to service around 3 February, was extended in order to complete repairs on critical equipment, the release said. AmSty said that it was making necessary repairs based on findings discovered during its maintenance turnaround, which began on 4 January.

As a result, about half of AmSty's St James production will be offline for the better part of the first quarter, according to the press release.

As a result of the two supply situations, ICIS-assessed styrene spot prices, which stood at an average of 63.83 cents/lb on 27 January, surged to an average of 66.20 cents/lb on 1 February. Some market participants said that prices would soon hit 68 cents/lb as there is no spot material in the market.

FEBRUARY TURNAROUND

The US styrene market will tighten further in February, when INEOS Styrolution begins a planned turnaround at its 450,000 tonne/year plant in Texas City, Texas.

At this time it is unclear how the Gulf outages will impact downstream markets, such as polystyrene (PS), expandable polystyrene (EPS) and acrylonitrile-butadiene-styrene (ABS).

North American styrene producers include Americas Styrenics, INEOS Styrolution, LyondellBasell Chemical, Pemex, Shell Chemicals Canada, Total Petrochemicals and Westlake Styrene. ■

ASIA

CLIVE ONG SINGAPORE

Asia SM seen higher amid holidays

Spot prices of styrene monomer (SM) in Asia were seen higher on 31 January despite the absence of major players in the region who were out of the market for the Lunar New Year holidays.

Bids for March cargoes were cited at $1,445/tonne CFR (cost & freight) China while offers were around $1,470/tonne CFR China, according to brokers. Spot prices remained firm that week with market perception of availability tightening from February as the scheduled maintenance season in the region will kick off.

However, with feedstock benzene prices retreating to under $1,000/tonne FOB (free on board) late the previous week, some SM participants expect the price uptrend to plateau.

"The price rise could fizzle out soon as benzene prices have corrected," said South Korea based trader.

Others said that market participants could be too optimistic regarding post Lunar New Year demand.

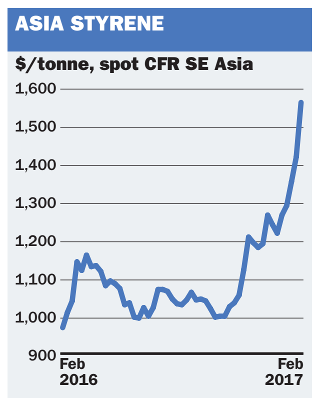
"The SM price increase also pointed to anticipated strong demand after the New Year," said a broker in Korea.

However, the outlook of the performance of styrenic resins post Lunar New Year remained mixed, with several resin producers conceding that it was difficult to keep pace with the SM price rise.

"Margins for resins producers are squeezed as plastics prices cannot keep up," said a polystyrene (PS) producer in southeast Asia.

SM is a liquid chemical used to make resins like PS and acrylonitrile-butadiene-styrene (ABS) and synthetic rubbers like styrene-butadiene-rubber (SBR) and styrene-butadiene-latex (SBL).

Meanwhile, SM players in the bullish camp continued to believe in higher prices in the near term as other feedstock ethylene numbers continued to rise on tight supply.



"Ethylene availability is tight and elevated prices will boost SM values," said another trader in South Korea. ■

NORTH AMERICA

TRACY DANG HOUSTON

US butadiene contracts hit high with global surge

Strong overseas prices and tight domestic supply have led to significant increases in US butadiene (BD) contracts for February, pushing up prices to their highest levels in nearly five years.

US February BD contracts have settled at various hikes of 26-31 cents/lb, putting prices for the month at 90-99 cents/lb ($1,984-2,183/tonne).

The February settlement leaves monthly prices at their highest since June 2012, when contracts were settled at 107 cents/lb for three individual producers and 115 cents/lb for another producer.

Market participants had been expecting double-digit increases for February contracts amid overall bullish sentiment.

US BD spot prices had been trending up on the back of soaring values in Asia, where prices had risen by more than 70% since early December.

Spot prices for Asia BD surpassed the $3,000/tonne mark in early January on the back of much-tighter-than-expected supply and inventory-building activities ahead of the Lunar New Year holiday.

The price upsurge in Asia have opened up a wide arbitrage from Europe and the US, prompting traders to seek export opportunities from those regions.

While one export cargo from the US was fixed for early-January loading, traders have been unable to find excess volumes for another fixture.

US BD supply has been tight, with spot material hard to find. Additionally, two producers are on supply allocation, further limiting availability. Sources said there have been some constraints because of recent and upcoming turnarounds, as well as unexpected mechanical issues.

Meanwhile, there has been increased demand from domestic consumers who are looking to acquire additional spot volumes.

Still, some consumers appear unwilling to pay as much for US molecules as traders looking to export, leading to a disparity regarding spot price ideas.

Spot bids for February BD via pipeline delivery were heard on 31 January following the settlement at levels flat to contract pricing.

Nevertheless, sources acknowledge that US BD prices are trending up, with expectation that spot values will rise further in February and push up March contracts.

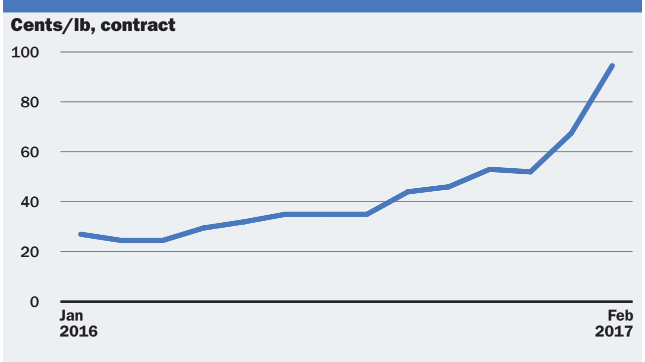
For now, market participants continue to watch the Asia market for indications on where global pricing is headed.

Spot activity in the Asia BD market is expected to be thin this week as participants are away to celebrate the Lunar New Year holidays.

Supply there is expected to continue to be tight, but it remains to be seen whether Asia BD prices are sustainable near $3,000/tonne.

US BD contracts typically settle at the end of the month for pricing in the upcoming month. Major US BD producers include ExxonMobil, LyondellBasell, Shell Chemical and TPC Group. ■

US BUTADIENE



ASIA

PAUL LIM SINGAPORE

Asia acrylates spot trades muted

Producers are watching for clear price trends and market fundamentals once China returns from Lunar New Year holidays

Spot trading of acrylic acid and acrylate esters in the week ending 3 February was limited but prices are expected to be stable-to-firm post the Lunar New Year holiday.

Discussions were thin – at the $1,400-1,500/tonne CIF (cost, insurance and freight) SE (southeast) Asia range for both glacial acrylic acid and butyl acrylate – as most players are still out of the market.

The Lunar New Year on 28 January was celebrated in southeast and northeast Asia. The holiday period varies, ranging from a day to a full week, depending on the country. China was on holiday from 27 January to 2 February.

Spot liquidity in the acrylic acid and acrylate esters market was expected to increase after the holidays.

Producers are hopeful that prices will be stable-to-firm, with supply to be constrained by scheduled turnarounds in the region.

They are looking at hiking prices further in the near-term, with a major middle Eastern producer continuing to offer volumes to southeast Asia and India.

In the key China market, discussions are expected to resume next week. Some re-stocking activities would likely support prices.

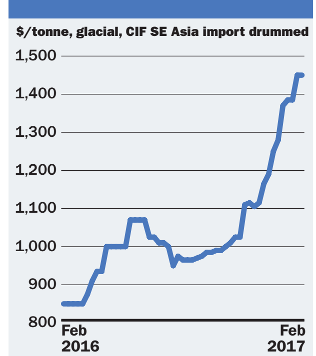
Producers are expected to restart their plants then, resulting in increased supply from the country towards the second quarter. However, this may not impact prices much, as a number of plants in other parts of Asia will undergo annual maintenance soon, with downtimes of at least three weeks to less than two months.

In southeast Asia, Malaysia and Singapore have yet to start active discussions. Vietnam remains on holiday.

Producers are watching for clear price trends and market fundamentals once China returns from the holidays before giving firm offers.

In India, most February-shipment cargoes had been fixed in the past weeks. Discussions for March-shipment cargoes were expected to rise but possibly tempered by an increase in supply coming from China. ■

ASIA ACRYLIC ACID



EUROPE

KATHERINE SALE LONDON

Tight Asia impacts global chains

Supply is tighter and prices higher for many European markets impacted by the reduced Asian supply over the last year

Chemical players in Europe are questioning what the impact of the Lunar New Year holiday will be on exports from Asia and, given the diminished inventories for a number of chemicals, whether the traditional increase of exports from the region will take place this year.

Tight supply and rising prices in Asia were key discussion points in 2016 across different chemical sectors. The impact on global trade flows led to upward pressure on prices in other regions, with the key driver being the Asian supply dynamic.

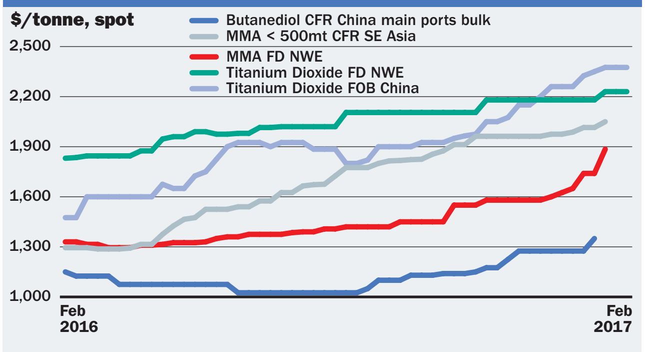
The Chinese environmental inspections monitoring the air pollution in the country also forced producers to reduce operating rates.

Price hikes because of supply have been seen in the melamine, butanediol (BDO), methyl methacrylate (MMA), polymethyl methacrylate (PMMA) titanium dioxide (TiO2) and propylene oxide (PO) markets, with many others also affected.

In November, the impact of this was particularly noticeable, with melamine buyers across the world scrambling for material.

Exports from China of melamine are estimated between 20,000-25,000 tonnes each month, with buyers turning to European producers to make up some of this shortfall.

PRICES RISE IN ASIA AND EUROPE



It was the impact of the tightening of supply in China that led to first-quarter melamine prices increasing significantly, after a year of stability.

This trend has been mirrored in other chemical markets, with an increase in requests for European product from buyers in the Middle East, India, Turkey, South America and other areas where Chinese producers have a significant market share.

In the MMA and PMMA markets, supply started contracting in April 2016 and the the global supply balance has been getting tighter and tighter since then.

With MMA supply short in Asia, less monomer was polymerised, reducing inventories for PMMA producers.

The European PMMA market traditionally sees a noticeable increase in imports, after the Lunar New Year holidays.

Demand falls in Asia during the festivities and, after the period, Asian producers look to export markets to relieve heavy inventories.

The impact can be seen in trade statistics for months after the holiday, especially for polymer markets as plastics are easier to store.

Rising prices in Asia have resulted in Europe being the lowest-priced region for certain products which, combined with a weakened euro against the dollar, makes exporting to the region unattractive at this time.

European TiO2 buying and reselling sources said imports from Asia are no longer competitive due to the price uptrend in that region, unfavourable exchange rate and high freight costs.

Contrasting to the usual trend, European players expect the Lunar New Year to have a lessened impact on imports this year.

Players expect this will give Asian producers an opportunity to replenish inventories to a healthy level.

With smog also clearing in some regions in the north of China and lower demand because of the holidays, supply in Asia for many products could reach a healthier balance over the next few weeks.

This is already leading to talk of downward pressure on prices in Asia on some products like PO, which have been plagued by the impact of lower operating rates from producers because of the smog issues.

Supply is at a tighter level for much of the European markets impacted by the reduced Asian supply over the last year. Buyers in these markets will welcome any increase of imports from Asia, and any relief this brings.

However, at this stage, players will have to wait and see if the usual flow of material will take place, with inventories lower after a turbulent time in the Asian markets. ■

Additional reporting by Jane Massingham and Heidi Finch

NORTH AMERICA

LANE KELLEY HOUSTON

Stretch film prices set to rise on polyethylene hike

US stretch film producers separately plan to raise prices by 7% in February in response to proposed polyethylene (PE) increases, according to letters to customers.

Industry data show that packaging film accounted for about 19% of all PE sales in the first 11 months last year. Low density (LDPE) and linear low density (LLDPE) film accounted for 92% of packaging sales.

Letters issued by four producers said the separate increases stem from hikes announced separately by a number of US PE producers for 1 February. The announcements call for prices to rise by 5 cents/lb.

A 31 January letter by Sigma Stretch film cited PE suppliers' plan to raise resin prices.

"Factors supporting this resin increase are improving domestic and global demand, rising feedstock costs, and lower than normal polyethylene (PE) inventory levels at the producers," said the Sigma Stretch letter.

"In response to this February 1st resin increase, all new orders received on or after February 24th will be priced at a 7% increase," the Sigma Stretch letter said.

Similar language, including a 7% increase after 24 February, appeared separately in letters by Berry Plastics, Intertape Polymer Group and Inteplast Group. Inteplast said the 7% increase would kick in after 27 February.

A preliminary estimate for December showed PE inventory fell by roughly 42m lb from November but still remained slightly above the monthly average for the past year. ■

GLOBAL

LANE KELLEY HOUSTON

Chemical shipping rate squeeze to last for while

The too-many-ships problem is not going away anytime soon, at least for the chemical tanker fleet.

London-based maritime consultant Drewry said in a report issued on 2 February that freight rates on long-haul routes will continue to be challenged by a surplus of large vessels over the next two years.

"The chemical fleet grew by 5.2% in 2016 and is expected to expand by 3.3% to the end of 2017, which will continue squeezing rates on major routes over the next two years," said Hu Qing, Drewry's lead analyst for chemical shipping.

"New orders and deliveries are also expected to decline further because of the depressed market and financial woes of shipyards."

Too many ships chasing too few cargoes has plagued chemical shipping off and on for years, and this dilemma is expected to continue.

Drewry's Chemical Forecaster study used similar language in late 2016, stating that rising fleet growth and softening seaborne trade will depress chemical shipping freight rates over the next few years.

Chemical shipper Stolt Nielsen has referred often to the problem in earnings reports over the past few years and did so recently.

"There is still an oversupply of tonnage, and with significant new building deliveries in 2017, combined with a weak product tanker market, we believe the year will be challenging," said CEO Niels G Stolt-Nielsen.

Freight rates on the two major chemical shipping routes in the Americas – the transatlantic eastbound and the US Gulf to Asia trade lane – declined by 9% during 2016, though some rates turned up in January this year.

The chart on freight rates shows rates for 2,000-tonne shipments in blue and 5,000 tonnes in gold.

New fixtures reported in the ICIS shipping report last year declined by 7% from 2015.

There has been a surplus of chemical shipping vessels on major routes, with many new building deliveries and swing tankers flooding the market, said Drewry's latest report.

Time charter rates weakened in 2016, especially for larger tankers, and freight rates on major long-haul routes dropped. While trade volume from the US to Europe and northeast Asia surged in 2016, the addition of speculative vessels brought rates down.

US GULF TO ASIA SHIPPING RATES

FLEET GROWTH TO DROP

The chemical fleet will continue to expand because of the large number of new vessel orders placed in previous years, but growth will be subdued compared to 2015-2016, Drewry said.

While deliveries and ordering have declined in 2016, there are still many ships scheduled to be delivered in the next five years.

More demolitions are expected because of new regulations that will come into force in 2017.

Coupled with the implementation of the Ballast Water Treatment System (BWTS) in September 2017, the adoption of the global 0.5% sulphur cap may potentially accelerate the rate of vessel demolition towards the end of 2020.

However, this is likely to have little impact on fleet supply, as most of the older ships are of less than 10,000 dwt (deadweight tonnes), and thus, the capacity that can be scrapped will be a small percentage of the total fleet.

Time charter rates weakened further in the fourth quarter of 2016, more so for larger tankers. ■

EUROPE

JONATHAN LOPEZ LONDON

Chem debt spree threatens ratings

The current eurozone's historic low interest rates may incentivize firms to continue pursuing transactions with debt

Limited organic growth since the 2008 financial crisis prompted European chemicals to pursue growth through mergers and acquisitions (M&A) but the debt-fuelled expansions threaten now corporate credit ratings, said ratings agency Moody's.

Pressure from shareholders to continue expanding revenue and profits will cause companies to pursue M&A transactions which could come at a cost, said Francois Lauras, senior credit officer for European chemicals at Moody's.

"European chemical companies now have little room to pursue new deals over the next 12-18 months without risking downgrades. This comes at a time of limited organic growth prospects for the sector and fierce competition for a reducing number of attractive takeover targets," said Lauras.

"Most European chemical companies now have limited headroom for further debt-funded M&A, but the pressure to continue acquisitions to boost future revenue and earnings growth is intense as firms struggle to grow organically post-2008."

The current eurozone's historic low interest rates may incentivise firms to continue pursuing transactions with debt but this "will inevitably put their current [credit] ratings" at risk.

Two giant agrochemicals deals dominated the M&A headlines in 2016 – that of ChemChina proposing to acquire Swiss major Syngenta and that of Germany's Bayer trying to acquire US-based Monsanto. Plus, Dow and DuPont are planning to merge and regulators are mulling over the deal's impact on the European ag sector.

Moody's said after the ag deals close, specialty chemicals will again be the main target for European M&A activity. It also cautioned on high M&A valuations.

"Many of the acquisitions announced in the past two years were valued at relatively high EBITDA [earnings before interest, taxes, depreciation and amortisation] multiples compared with historical levels. ■

EUROPE

LUKE MILNER LONDON

Acetone spot highs refuse to fade

Prices remain high, dashing buyers' expectations. The spread to contract propylene illustrates the real strength

The rapid rise of acetone prices in Europe in late April 2016 took many market participants by surprise.

"My personal feeling is this will be temporary," said a distributor on 28 April, reflecting the view of most market participants.

However, with the European acetone market entering February 2017 with spot prices still well above contract price levels, this unexpected guest, widely supposed to be a brief visitor, has settled into the market and refused to leave over the intervening months.

The performance of acetone spot prices warrants consideration, not so much because of the price levels obtained, with highs of €850/tonne FD (free delivered) NWE (northwest Europe) achieved in late spring and early summer 2016 and new highs of €860/tonne FD NWE in the closing days of January 2017, being seen and surpassed in previous years, but because of their sustained strength.

From early April until the present, acetone spot prices in Europe have remained above acetone methyl methacrylate (MMA) contract price levels. And while this in itself is worth consideration, it is the spread to the feedstock propylene contract price which illustrates the real strength.

ACETONE OVER PROPYLENE

Although the acetone spot price surpassing the propylene contract price has happened several times since 2010, notably in early 2013 and from late April until early June in 2010, the duration of acetone spot prices above propylene contract prices from mid-April until September 2016, offers the best proof of the underlying strength. Acetone spot prices once again surpassed the propylene contract price in late January 2017, and while from October until late January the acetone sport price was below the propylene contract price, it remained above the acetone MMA contract price.

While acetone contract prices are largely dictated by movements in key feedstock propylene, spot prices are driven by supply and demand dynamics in the acetone market.

The initial uptick in acetone spot prices began in the period ahead of May 2016 and separately planned turnarounds at INEOS Phenol's Antwerp, Belgium site and at PKN Orlen's Plock, Poland, site.

DASHED EXPECTATIONS

However, in a market where structural overcapacity on a global scale is widely accepted to be an ongoing issue for producers, many market participants in April and May 2016 expected prices to fall as rapidly as they rose.

A trader said, on 4 May: "In a month and a half the situation will change. Nobody is going to import. The producers maintain the idea that the shortage will be short lived".

This expectation also influenced buyers' habits.

In late April, a buyer said: "We decided to refrain from buying until the second half of May when we expect prices to come down."

Delayed purchases, with the aim of avoiding high spot prices, then influenced the European market into the summer months.

One distributor said in July: "I suspect demand will go on for a while – consumers don't have so much in stock. I think that that will keep demand going on a little bit, so they cannot fall back on reserves. Sales will go on for the next four to six weeks. There will not be a very deep drop during the summer period as most consumers cannot rely on existing stocks."

However, from late June until mid-August there was a gradual softening of acetone spot prices, while mid-August to early October saw a period of stable spot pricing.

August also saw two further separately planned turnarounds, at Novapex's site in France and Domo Caproleuna's site in Germany.

AMERICAS DEMAND

Meanwhile, acetone demand in the Americas held the interest of Asian exporters throughout the summer and into the second half of 2016, as well as piquing the interest of European acetone sellers in late 2016.

Indeed, surging acetone spot prices in Asia and demand from the Americas encouraged sellers to export at the end of 2016, amid expectations the demand in Europe would falter ahead of the festive holiday season.

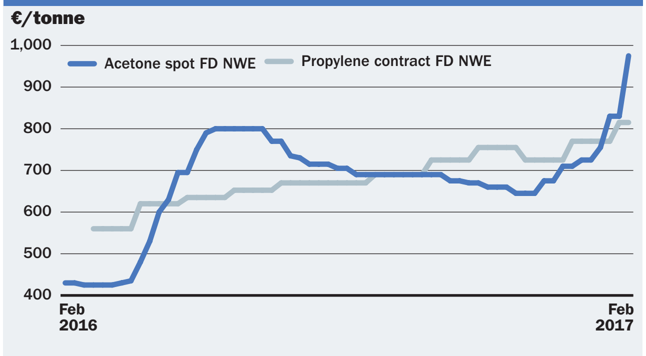
However, demand in Europe in December was better than expected, and this led to a renewed uptrend in acetone spot prices.

> **"I suspect demand will go on for a while – consumers don't have so much in stock"**
> DISTRIBUTOR

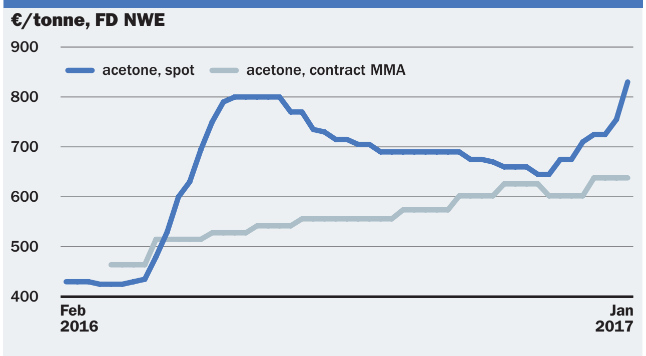
One trader had two explanations for the situation in December, saying on 14 December: "Everybody waited for a propylene decrease in December in order to buy. Therefore, demand is stronger. [Secondly] prices in Asia are increasing and people are trying to use this advantage in order to export."

Speaking on 15 December,

EUROPE ACETONE TO PROPYLENE SPREAD



EUROPE ACETONE SPOT VERSUS CONTRACT



» another trader said: "Demand for acetone on the spot market is pretty good. [The] over cautiousness of some producers committing a lot of export material to Asia and the US have [led to] price hikes… What I would assume is that they committed to exports expecting the market to be disastrous."

"Low phenol run rates [are] part of the problem"
PRODUCER

The renewed uptick in spot prices continued into the new year, showing no signs of abating in late January as market tightness, the initial cause of the April 2016 rise in spot prices, remained the driving factor behind firmer acetone spot prices.

PHENOL RUN RATES

While turnarounds, export opportunities and altered buying patterns have all been cited as causes of the European acetone market's supply and demand imbalance, an underlying issue for acetone remains phenol run rates.

Most acetone is produced as a co-product of phenol. Throughout the period of tightness in the acetone market the phenol market has been well balanced, as producers look to maintain phenol's supply and demand equilibrium.

However, the balance in the phenol market has unbalanced the acetone market, tightening supply.

"Low phenol run rates [are] part of the problem," recognised one producer, speaking in January.

"This is the consequence of a continued lowering of production rates because profits were low. Demand for phenol has not been great… so production has been limited," said a trader in May.

This underlying issue continues to muddy the water for acetone buyers, obscuring their view of future developments in the market.

"I am still trying to avoid spot as much as possible," said one buyer on 26 January, adding that phenol run rates may improve in the coming months.

However, a producer said that it saw no reason to expect run rates to rise during Q1.

While the continued presence of high acetone spot prices is welcomed by producers, for buyers the proverb equating guests to fish, which begin to smell after three days, is more than applicable to the acetone spot price. After more than nine months, spot prices show no sign of falling back down below the contract price.

With market dynamics currently supporting acetone spot price levels and the expectation of weaker spot pricing frustrated time and again from May 2016, it remains to be seen whether they will be dislodged during 2017 or whether the phenomenon is here to stay. ■

EUROPE
MELISSA HURLEY LONDON

Europe SBR spot surges on supply

Upstream feedstock prices are also rising with styrene and butadiene values increasing steeply in recent weeks

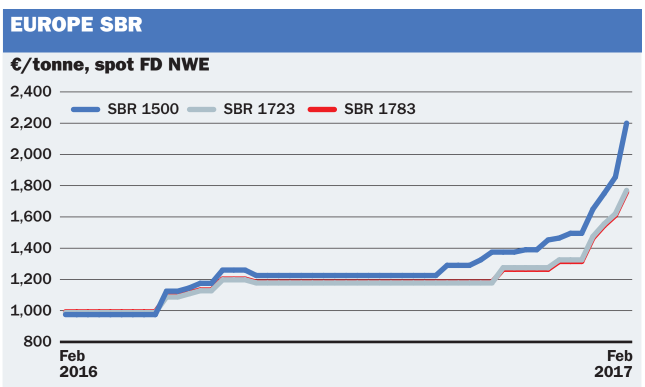
Higher prices in the European styrene butadiene rubber (SBR) spot market were heard in the market due to very limited availability and because of the magnitude of the increased feedstock costs, which is heavily affecting the downstream SBR market, sources said on 1 February.

Spot prices continued on an upward curve once again, following the firmness in the styrene and butadiene (BD) upstream markets.

Dry grade prices were on average €2,000-2,400/tonne FD (free delivered) NWE (northwest Europe).

SBR 1500 dry-grade spot prices increased by €250/tonne on the low end of the range and by €440/tonne on the high end, bringing the range to €2,000-2,400/tonne FD NWE.

SBR 1723 oil-extended grade spot prices increased by €150/tonne at both ends, bringing the range to €1,740-1,800/tonne FD NWE. SBR 1783 oil-extended grade spot prices increased by €150/tonne at both ends, bringing the range to €1,730-1,790/tonne FD NWE.



Prices even above this level were heard in a couple of cases; however, there was a lack of confirmed business above the mentioned range.

Some buyers are attempting to wait until they need to buy. Buyers who are not in a position to wait must secure material regardless of the price situation in order to keep production moving, according to one source.

Sources said that SBR buyers are worried about absorbing the high price increases but understand that supply and upstream feedstocks are the key drivers of the increases.

The European BD contract price for February settled at the highest recorded increase since BD contracts moved to a monthly basis in January 2011.

The ratio of BD used in SBR production is higher than that of styrene, so the BD monthly settlement is a key factor in SBR contract negotiations.

Nonetheless, the styrene barge contract price was also agreed last week at a triple-digit increase compared to last month, which is adding to the continued upstream feedstock pressure.

A buyer said that current SBR prices have yet to reach the level seen in 2011 but said that the market is heading towards that level.

Rubber demand is at a good level, with one source citing demand as better in January compared to the same period as last year.

In the tyre market, several companies have announced sale price increases of 5-6% on average due to the raw material price hikes recently.

Marangoni Industrial Tyres has announced in a company press release that it would increase the sales price up to 6% for all products in its division beginning 1 February 2017.

Conversely in the non-tyre market, one source said that it is more difficult to pass on the price increases to end-users. ■

ASIA

DAPHNE HO SINGAPORE

Benzene prices on rebound

Prices are expected to rise further following the end of the Lunar New Year holiday

Spot benzene prices in Asia rebounded on 1 February and may continue to increase in the near term as regional supply remains tight amid an expected pick-up in Chinese demand after the Lunar New Year.

Regional benchmark prices increased $10-20/tonne from the previous day to $972-987/tonne FOB (free on board) Korea, largely tracking gains in the US market overnight, according to ICIS data.

Benzene prices had weakened from more than a two-year high of $1,017/tonne FOB Korea on 25 January, with the key Chinese market closed for the Lunar New Year holiday from 27 January to 2 February; and the recent decline in the US market.

But regional traders were expecting prices to increase again when Chinese market players returned the following week.

"Chinese end-users still have March requirements unfulfilled," said a northeast Asia-based trader.

"Overall, China downstream [markets] seem to be bullish," said another northeast Asian trader.

DOWNSTREAM MARKETS

In the styrene monomer (SM) market, prices have been rising, with discussions for March cargoes heard at $1,445-1,470/tonne CFR (cost and freight) China on 31 January.

In the caprolactam sector, market sentiment is bullish, with prices expected to rise further amid tight supply.

On 25 January, capro prices were assessed at $2,040-2,120/tonne CFR NE (northeast) Asia, according to ICIS data. Asia's benzene prices had surged in the previous weeks on the back of short-covering activities by traders.

US market gains and tightened regional supply following unexpected plant shutdowns in South Korea and Japan.

SK Global Chemical's (SKGC) benzene production at a unit in Ulsan, South Korea, was halted following a fire caused by a hydrogen gas leak at its compressor valve, according to market sources.

The shutdown has aggravated the tightness in February and March spot cargoes.

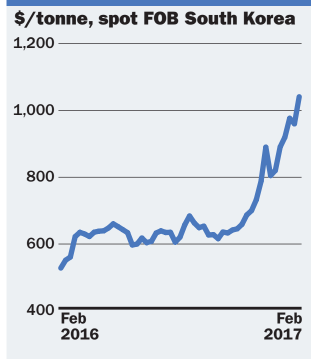
Meanwhile, benzene demand is strong coming from Japan amid heavy turnaround schedule at its domestic aromatics units in the second quarter.

Asia's benzene prices had also been tracking closely the US market.

Market players are waiting for the Asia-US arbitrage window to open as short supply in the US should be fulfilled by exports from South Korea, although there had been no arbitrage opportunities in January.

On 1-29 January, South Korea has exported 17,412 tonnes of benzene to the US, according to market sources. ■

ASIA BENZENE



EUROPE

VASILIKI PARAPOULI LONDON

Expandable polystrene market mulls lower output

The European expandable polystyrene (EPS) market is bracing for potentially difficult February contract price discussions as the feedstock styrene barge contract recorded another three-digit increase for the month, sources said on 3 February.

Based on indications from the European styrene spot market, an upward movement was more or less expected, but not at this level, and that has created a lot of concern among EPS market participants.

According to EPS sources, margins are weak and styrene is expensive, while the upward pressure on pricing in Europe could persist for the rest of the first quarter given several production issues in the US styrene market.

Consequently, there was extensive market talk that EPS producers were considering cutting back production rates, while one of them was said to not be producing at all for February, although the reason why remained unclear.

Meanwhile, some converters in Germany and Austria were also thinking of reducing their production. On the EPS pricing front, producers are targeting increases of €200-260/tonne, while buyers are waiting to get a better market overview and then define their targets for this month.

It will be a very difficult task to pass on the full monomer increase but some producers said that there is no other option as profitability is low while the wintertime does not help demand.

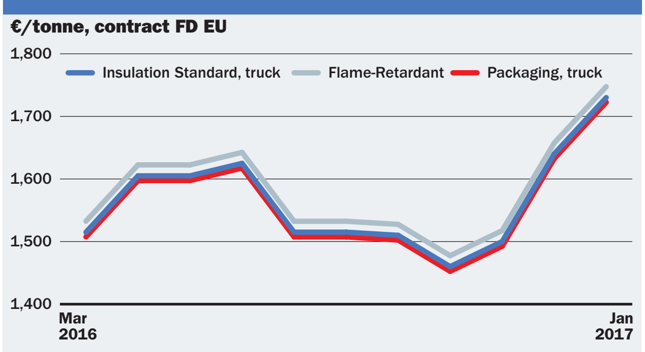
Sources from the buy side said that they will only purchase what they need and, at the same time, make optimum use of stocks.

Nevertheless, others that did not buy at all in January will be forced to place their orders now.

Sources said that in the construction business it would be difficult to switch from EPS to other materials, but in other industrial sectors like packaging, for instance, EPS competes with paper.

Although changing EPS for other products may not be easy, the high prices, as well as the volatility in the market, are encouraging some market participants to look towards other alternative directions. ■

EUROPE EPS



ASIA

PAUL LIM SINGAPORE

Asia paraxylene seen stable-to-firm

Demand is strong, supply is constrained, and rising naphtha feedstock prices are all contributing to stronger pricing

Asia's paraxylene (PX) prices are expected to be on a stable-to-bullish trend in the near-term on firm market fundamentals and bullish trading sentiment.

Prices are presently at a 19-month high with the start of spot trades for March and April shipments. Discussion levels have been moving up, diverging from the range-bound movement in crude oil futures at the $55-56/bbl range on 6 February.

Bids for March-shipment PX cargoes were at $923-925/tonne CFR (cost and freight) Taiwan/China in early trade, against offers at $929/tonne CFR China/Taiwan. For April-shipment cargoes, bids were at $931-932/tonne CFR Taiwan/China, while offers stood at $938/tonne CFR Taiwan/China.

The last time prices were at these levels was in June-July 2015, during the crude oil rout that started in the fourth quarter of 2014.

Traders said demand from the downstream purified terephthalic acid (PTA) sector is expected to be stronger due to a seasonal pick-up in polyester demand, while supply is constrained by turnarounds and outages at refineries and plants in northeast Asia. Consequently, traders have been bidding up prices for cargoes for March and April shipments. Buyers were continuing to cover their positions amid expectations of tighter supply, particularly, when idle PTA capacities restart in the key China market.

Chongqing Pengwei's idled 900,000 tonne/year PTA line in southwestern China is expected to resume production this February, while Zhejiang Huabin's 1.4m tonne/year No 4 PTA line is targeted to come back on stream sometime in the second quarter.

Most market players in China were just returning from their Lunar New Year holiday on 27 January to 2 February. PX supply is not particularly tight at this point, industry sources said, citing sufficient offers of physical cargoes in the market.

But there is more room for prices in the overall aromatics and polyester chain to continue moving up, given the current lofty benzene prices and bullish forward three-month outlook, they said. Strong enquiries to move US-origin PX supply into China indicate a bullish market sentiment. There is an enquiry to move a 10,000-tonne PX parcel – for shipment on 15-28 February – from Pascagoula, Mississippi to China, market sources said.

NAPHTHA SURGE

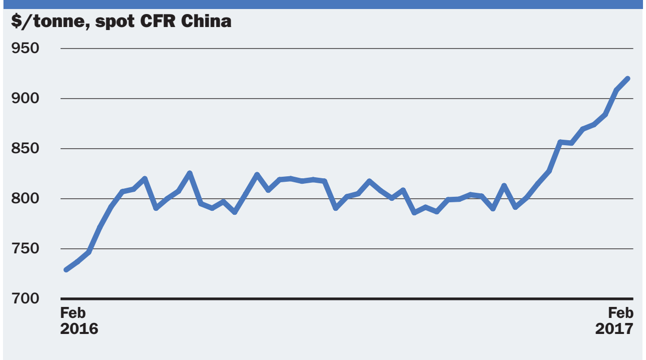
A recent surge in naphtha prices have also been supporting PX values. The naphtha market, which is currently in a deep backwardation, is being buoyed up by recent refinery incidents and less arbitrage cargoes coming from Europe and the Middle East.

The naphtha-PX spread is currently at the $380-390/tonne level and is expected to remain this wide in the near term, market sources said.

The PX market is trading at a contango, with prompt March-shipment prices lower than April shipments.

The onset of the summer driving season in the US and parts of Asia may support naphtha and aromatics prices further. An expected strong demand for gasoline-blending components like aromatics may pull toluene and xylenes into the blending pool, thus reducing the availability of raw material required for PX production. ■

ASIA PARAXYLENE



ASIA

ANGELINE SOH SINGAPORE

SE Asia isopropanol may extend gains

Isopropanol (IPA) prices in southeast Asia look set to continue their uptrend due to tight supply amid high feedstock cost, market players said on 3 February.

In the current week ending 3 February, two 500-tonne cargoes of northeast Asia-origin changed hands at $950/tonne CFR (cost and freight) SE (southeast) Asia for end-February loading.

Offers for other northeast Asia-origin cargoes were at $1,000/tonne CFR SE Asia and above, while southeast Asia-origin cargoes were offered at $950-960/tonne CFR SE Asia. On 27 January, IPA prices were at $920-960/tonne CFR SE Asia, and have been steadily rising in the past six assessment weeks, since early December, based on data compiled by ICIS.

Market players are bullish about the price outlook for February, as spot IPA availability in Asia might be reduced by the opening up of arbitrage window to the US.

Some northeast Asia-based producers have received queries from US, where supply has tightened due to turnarounds and production issues at some major domestic plants.

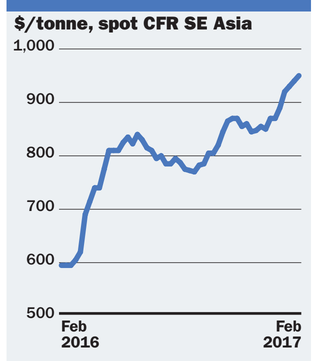
"The prices in Asia are high, and their profits could be comparable to the US prices," said a northeast Asia-based producer.

IPA production in Asia, meanwhile, is being curtailed by the high cost of feedstock acetone.

Some players added that acetone production is being favoured over IPA, since it offers stronger margins.

"We've to be careful about IPA production as [feedstock] acetone cost is so high," said a northeast Asia-based producer. Acetone prices were assessed at $920-935/tonne CFR SE Asia in the week ended 27 January, according to ICIS data. ■

ASIA IPA



EUROPE

LINDA NAYLOR LONDON

Europe polymer buyers face hikes

Planned maintenance outages later this quarter and into the second quarter of the year are expected to limit output

European polypropylene (PP) buyers are under a lot of pressure to pay more than the €45/tonne increase in the February propylene monomer contract this month, sources agreed on 6 February.

"I haven't closed [the month] yet, but it [increase] will be more than monomer," said one buyer. "One of my suppliers offered me plus 80 [€/tonne] take it or leave it," said another, who eventually declined to pay such a hike.

"PP is flying," said a producer. "We are passing on more than the monomer."

In spite of higher prices being pushed through in all regions, there were no signs of real shortages, said sources. Nobody claimed that supply was long, either, but buyers said they were managing to get what they needed, even if they were shifting suppliers when new offers for February were too high.

Design Pics Inc/REX/Shutterstock

Europe polypropylene prices are flying high on strong demand

Much of the strong demand and unwillingness on the part of suppliers to accept simply the pass-through of monomer into PP pricing is probably coming from the fact that planned maintenance outages later this quarter and into the second quarter of the year are expected to limit output and put some PP grades into tight supply. This, coupled with fewer imports, is leading to a great deal of confidence from suppliers and some consternation from buyers.

Nobody was prepared to face shortages such as those of 2015. Suppliers also point to the weaker polymer/monomer spread during the second half of 2016. A wide range of spot prices was available in the market, with copolymer grades stronger than many homopolymer products, said sources.

Homopolymer injection spot prices have risen from levels barely above €900/tonne FD (free delivered) NWE (northwest Europe) in November, to above €1,100/tonne FD NWE in some cases in February.

PE BUYERS FACE HIKES

Polyethylene (PE) buyers are facing price hikes up to €95/tonne for February, sources said on 3 February.

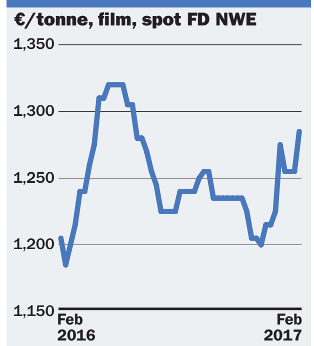
There was an array of offers, but none was as low as the €35/tonne increase of the February ethylene contract.

"The spread between monomer and polymer is at its lowest point for many months," said one producer.

It was not just producers' margins that were forcing higher prices on to the market, however, but concern over supply and the possibility that grades may become tight as a series of planned cracker maintenance outages begins later in the quarter.

Security of supply has been of paramount importance in the PE market since the supply issues of 2015, and while sources saw the current situation as different to that of 2015, the expectation – and indeed current awareness – that imported volumes were lower, was adding to the concerns. ■

EUROPE LDPE



EUROPE

PAVLE POPOVIC LONDON

Europe TDI sees February increases

European toluene di-isocyanate (TDI) players said on 1 February that early contract settlements for February have price increases reaching up to €100/tonne.

Most sources remarked that there is still a shortage of TDI although a few players said the product's supply situation has improved since the end of last year. TDI's availability issues began last year after the delayed start of BASF's 300,000 tonne/year Ludwigshafen plant in Germany.

Although the firm commenced TDI production towards the end of 2016, by November it stopped operations due to a leak. These supply issues were also augmented by Covestro's force majeure on its TDI production in October 2016.

Nevertheless, Covestro resumed full operations at the end of last December while players say that BASF has been importing TDI from outside of Europe. The shortness of TDI, however, according to one producer, is limiting the effect feedstock movements can have in the TDI market.

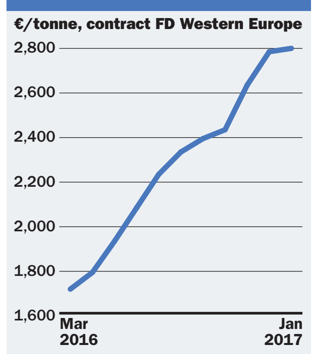
Upstream toluene had an initial settlement for February in which it increased in price by double digits but the seller said this had a restricted influence on TDI's prices this month.

The producer continued to say that high demand, typical for this time of year, played a part in contract negotiations and that sellers and consumers are currently attempting to build up their stocks. TDI's supply issues has also resulted in upwards price pressure in the European polyols market as both products are used together to create flex foam.

In the European market, it has been said before that sellers sometimes offer TDI and polyols volumes as a combined deal. This is known as packaging in the industry.

A distributor said that packaging has played a role in February contract negotiations. ■

EUROPE TDI



NEW PROJECTS AND PERMANENT PLANT SHUTDOWNS

REPORTED BY ICIS NEWS 30 JANUARY - 5 FEBRUARY 2017

NEW PROJECTS

Company	Location	Product	Capacity*	Process	Contractor	Cost	Start-up	Status
Borealis	Kallo, Belgium	propane dehydrogenation (PDH)	740,000	Honeywell UOP's C3 *Oleflex* technology	Honeywell	-	late 2021	E
Chevron Phillips Chemical (CP Chem)	Texas, US	polyethylene (two units)	1m	-	-	-	Q4 2017	U
		ethane	1.5m	-	-	-	Q1 2018	U
Cronus Chemicals	Tuscola, Illinois, US	ammonia	725,760	-	-	-	2020	P
Enterprise Products	Mont Belvieu, Texas, US	isobutylene	425,000	-	-	-	end 2019	P
OMV/Abu Dhabi National Oil Company (ADNOC)	Borouge, Abu Dhabi, UAE	petrochemical complex	(x)	-	-	-	-	P
Praxair	Dow Chemical's production hub, Freeport, Texas, US	hydrogen	-	-	-	-	-	C
Saudi Arabian Mining Company (Ma'aden)	Wa'ad Al-Shamal, Saudi Arabia	phosphate	-	-	-	-	H1 2017	U
Slovnaft	Bratislava, Slovakia	low density polyethylene (LDPE)	220,000	-	-	€300m	-	D
YCI (China's Shandong Yuhuang Chemical Company)	St James Parish, Louisiana, US	methanol	-	-	Amec Foster Wheeler	-	-	U

Notes: *Capacity: figures given in tonnes/year; tonnes/day are converted by multiplying by 330. (x) = expansion; T = total capacity including expansion.
Start-up: Dates given are for planned start-up. H1 = 1st half year; H2 = 2nd half year; Q1 = 1st quarter; Q2 = 2nd quarter; Q3 = 3rd quarter; Q4 = 4th quarter.
Status: S = study; P = planned; A = approval; E = engineering; U = under construction; C = completed; D = delayed; CAN = cancelled.

Drive to measure sustainability

Sustainability assessment is gaining momentum in the industry. It can identify which products will contribute to a more sustainable future and higher growth

Portfolio sustainability assessment could be in various applications

Cultura/REX/Shutterstock

HEIDI FINCH LONDON

There is a drive in the chemical industry for voluntary action in the field of sustainable innovation in order to gain competitive advantage by mitigating risks, identifying new opportunities and maximising growth potential, accordng to consultancy Arthur D Little.

While there are regulatory requirements – cutting carbon dioxide (CO2) emissions, using renewable energy, phasing out certain technologies such as converting mercury cell to membrane technology for chlorine production – necessitating changes in the chemical industry for sustainability reasons, these are not the only examples, said Martijn Eikelenboom, partner at Arthur D Little.

"We see that most of the [sustainability] action is voluntary (ie, on top of legal requirements) and they [chemical companies] want to become better competitors," Eikelenboom said.

Chemical companies want to play a leading role and capture value in new emerging ecosystems such as reusing waste gases (ie carbon dioxide (CO2)) in order achieve a more sustainable world, he added.

Portfolio Sustainability Assessment (PSA) is a tentative name, albeit unofficial for the time being, used by Arthur D Little and chemical players involved in the Product Portfolio Steering project for Sustainable Materials set up by the World Business Council for Sustainable Development (WBCSD).

PORTFOLIO SUSTAINABILITY

The concept of portfolio sustainability assessment is gaining momentum in the industry. It is being used as a tool to identify which products – in which applications and in which regions – are contributing to a more sustainable future and higher growth expectations. And also to identify those products which are not, and are at risk of discontinuity or substitution.

For example, the chemical bisphenol A (BPA) is used in various applications, but the type of application is very important in assessing sustainability, said Eikelenboom.

When BPA is used in aluminium cans or baby bottles versus in coatings for windmills, it has a different sustainability performance, he added.

In applications in cans, there are clear signals that the product is of concern for health related reasons, whereas in windmill applications, where there are not the sustainability concerns about human exposure, BPA is likely to experience above average growth rates.

> **"PSA may provide a great deal of information to the innovation function"**
>
> **MICHAEL KOLK**
> Partner, Arthur D Little

In simple terms, PSA is a sophisticated tool, based on a detailed questionnaire, that chemical companies can use to ascertain and rate the sustainability of their products in certain applications and regions based on facts, said Michael Kolk, another partner at Arthur D Little.

TRAFFIC LIGHT LABELLING

The "traffic light labelling" of many portfolio sustainability assessment approaches provides companies with alerts about products which are sustainable and those which are not. It can flag up which part of a company's turnover and margin are at risk of potentially being banned or put on "a watch list" for sustainability reasons.

Hydrofluorocarbons (HFCs) were an example of a group of chemical products where red flag signals were appearing well before 2010, according to Arthur D Little.

It is important to see the early signals in market across the globe to be able to act in good time and make any necessary changes in the portfolio for

the sake of sustainability. "If you wait till the legislation, then you are too late," said Eikelenboom.

He said early planning is particularly important in the chemical industry, taking into account the lengthy lead times for making such changes.

Portfolio sustainability assessment helps to anticipate the future of a product in terms of environmental, health, economic and social sustainability.

"PSA may provide a great deal of information to the innovation function," said Kolk.

It allows chemical companies to link longer term sustainability driven trends to the product portfolio and helps with the planning process, he added.

It thereby helps companies not only identify sustainability risks but also encourages them to broaden their innovation scope from typically smaller short term improvements to larger and longer term decision making.

PSA can encourage chemical players to look at other technologies, which produce "greener" products and can help with R&D planning and mergers and acquisitions (M&A) opportunities.

Changing to a new, more sustainable technology is an example of a long term decision, which opens the door to healthier, environmentally sustainable, "greener" product opportunities.

Belgium-based Solvay is a chemical company that has embraced sustainable innovation for some time. According to Arthur D Little, it is was one of the early movers and, as such, its systems have become more sophisticated.

Solvay's commitment to sustainable portfolio management (SPM) informs decision-making and helps executives create sustainable solutions. According to the consultants, it gives the company a competitive edge.

Aligning a chemical product portfolio with relevant sustainability trends should lead to stronger, longer term growth, said Kolk. Assessing the product sustainability of a company's chemical portfolio with guidance from the WBCSD provides a robust framework to gauge sustainability, he added.

It also helps instil confidence and credibility in the sustainability of a chemical company, is attractive to stakeholders and customers alike, and promotes good relations.

A further benefit is that it can help to attract talent, particularly from the younger generation.

"We see that most of the [sustainability] action is voluntary (ie, on top of legal requirements) and they [chemical companies] want to become better competitors"

MARTIJN EIKELENBOOM
Partner, Arthur D Little

GAINING MOMENTUM

Sustainable voluntary action in society has been gaining momentum, and it makes sense for chemical players to tap into this.

The NGO Urgenda took the Dutch government to court in 2015, claiming that the Netherlands was not doing enough to reduce greenhouse gas emissions. It was the first time that human rights had been as a legal argument to protect citizens against climate change. Urgenda won the lawsuit, although the Netherlands Government is making an appeal, said Eikelenboom.

Taking into account the growing sentiment for sustainability in the wider market, the drive by chemical players to assess product sustainability helps them to plan and better prepare for a more sustainable future. It boosts the potential for growth and provides a healthier and more socially sustainable future from which everyone can benefit. ■

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ICIS Base Oils & Lubricants 2017

MARKETS IN TRANSITION

GLOBAL TRENDS POSE INDUSTRY CHALLENGES

Low oil prices, overcapacity, new standards and sustainability keep producers on their toes

COMMENTARY

JOHN BAKER LONDON
john.baker@icis.com

"The impact on markets has been variable, with local factors determining... material availability and demand... and the pace of transition between grades"

Some years can seem much longer than others. Some, on the other hand, appear to fly by. Perhaps 2016 was one of the latter – with markets relatively steady and with most issues largely under control, or at least recognised and understood.

There is no doubt, though, that the base oils industry is working through a period of transition, just as discussed in this Commentary in the 2016 issue of this publication.

And indeed, "markets in transition" is the theme of this year's 21st Global Base Oils & Lubricants Conference being held as usual in London. Speakers and delegates will be exploring the drivers for change and coming away with a more informed and, hopefully, certain view of where the sector is heading.

The low oil price and sluggish growth in base oils demand and for national economies are a continuing backdrop to what is happening. On top of this are overlaid the shift to lower viscosity engine oils, increasing capacities for premium Group II products, and rationalisation by and amongst producers and blenders and formulators, through plant closures and M&A activity.

The impact on markets has been variable, with local factors determining not only material availability and demand, and hence pricing trends, but also the pace of transition between grades.

In many regions of the globe, as we report in a series of regional market reviews beginning on page 18, price ideas are firming as we enter 2017, but not on any underlying improvement in demand, which remains flat if not slightly negative, especially in the more developed economies. And indeed, in some grades, where supply is longer at present, we are seeing some softness, in brightstock in Europe, for example, and Group III in Asia.

All of which promises to make the ICIS base oils event a fascinating one, as industry experts seek to make sense of it all for delegates. I hope you find this publication informative and that you enjoy the conference if you are attending it.

ICIS Part of rbi reed business information

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Time of transition for global base oils

Lower crude oil prices, overcapacity, the shift to premium base oils and consolidation in the market are all impacting base oil producers around the globe

CYNTHIA CHALLENER VERMONT, US

The theme of this year's ICIS World Base Oils & Lubricants conference is "Markets in transition" – and for a good reason. It is not just market fundamentals that are shifting.

The geographic distribution of production facilities is also changing rapidly due to ongoing investments in new capacity despite an oversupply situation.

Mergers and acquisitions across the supply chain – among base oil manufacturers, lubricant producers and distributors – are also changing the market landscape. Higher crude oil prices in 2017 may exacerbate some of these trends. And last, but not least, sustainability has also entered the mindset of the European lubricants industry.

Overall, global demand for base oils and finished lubricants was flat in 2016 compared to 2015, according to several different industry experts. In mature economies (the US and EU), demand actually declined slightly due to ongoing efforts to increase performance and efficiency and thus reduce the need for lubricants.

While slight growth in demand in emerging economies balanced these losses, the overall market remained flat due to lower than expected rates of expansion in countries like China, India, Brazil and Russia.

In 2017, whether or not any overall growth is seen will once again depend on these emerging economies, according to Valentina Serra-Holm, marketing and technology director for naphthenics with Nynas.

OVERSUPPLY IN THE MARKET

This flat growth in demand is occurring at a time when base oils are in a 5m tonne/year "oversupply" position, according to Geeta Agashe, president of Geeta Agashe & Associates. This is despite five recent closures and has resulted in an average plant capacity utili-

sation rate of around 70%.

Looking at specific base oil groups, the shift away from Group I to Group II/III continued in 2016, even in China. "The base oil market continues to be

"These changes in regional base oil capacities and local demand are creating new dynamics in the global market"

ALAN OUTHWAITE
Manager, base oil business development Europe, Chevron Lubricants

very dynamic," says Alan Outhwaite, manager of base oil business development in Europe for Chevron Lubricants. "Whilst overall capacity has increased, there is a significant shift in the ratio of produced API groups driven by the demand for premium base oils required to meet increasingly stringent lubricant specifications," he adds.

In addition to evolving specifications as a driver for increased use of premium base oils, formulators are also trying to optimise additive treat rates given improved base oil properties, according to Outhwaite. He adds that Group II base oils are required for certain applications and are capable of replacing Group I in some, as well as optimising levels of Group III in selected automotive applications.

A separate factor leading to the displacement of Group I and II with Group III and IV base oils is a migration to lower viscosity motor oils, which is driven by fuel economy needs. An additional watch point for 2017 and beyond, according to Outhwaite, is the supply/demand balance of heavy base oils, notably brightstock, of which the European region is a net exporter.

Higher crude oil prices in 2017 may also impact the shift in production to Group II/III base oils. Serra-Holm observes that "base oils prices are likely to increase, but it is uncertain whether producers will benefit due to the increased cost of capital they will face."

Group II/III base oil producers, she adds, "will however likely be less impacted than Group I producers because the former processes are coat-tailed on to other refinery operations and carry a lower portion of the total cost. Group II/III producers also have greater flexibility when it comes to crude selection and hence higher negotiation power, which helps further minimise the impact of changes in crude oil prices."

On the other hand, she notes that base oils producers may, in response to crude futures, elect to switch to gasoline or diesel fuel production, which could impact base oils supply.

Looking at the numbers, API Group I previously represented the majority of capacity, but today accounts for just 41%, while there have been significant increases in API Groups II (34%) and III (13%), as well as re-refining capacity, according to Outhwaite. Indeed, a total of 36,000 barrels/day (1.8m tonnes/year) of Group I capacity was lost in 2016 alone, according to Serra-Holm, and she expects further rationalisation, including significant reductions in Group I capacity in Japan in 2017, with more to come in Europe as well.

"This trend toward higher-quality base oils is also being increasingly observed in emerging economies. India has expressed interest in adopting European-like emissions legislation that will drive the shift. China is already moving to Group II base oils, and in Russia several producers have announced capacity upgrades from Group I to Group II, with around 600,000 tonne/year of Group I disappearing in the next two to three years. As a result, all of the leading economies are actively pursuing the shift away from Group I base oils," she states.

LOW GROUP II PRICES

One result of this shift, however, has been from a technical demand standpoint the undersupply of Group I base oils, particularly in the high viscosities, according to Agashe. On the other hand, Group II and III base oils are oversupplied, particularly in the low viscosity grades. "Group II base oils are in fact being used in applications that could in theory be formulated using Group I, because currently Group II base oils are sold at lower or similar prices in many geographies, as compared to Group I's," she comments. Meanwhile, naphthenics and poly-alphaolefins (PAOs) are balanced currently on a global basis.

»

SUSTAINABILITY **CYNTHIA CHALLENER** VERMONT, US

EU LUBRICANT MAKERS DRAW UP STANDARDS

SUSTAINABILITY IS another area that the lubricant industry is finally beginning to address, most notably in Europe.

Inspired by Fuchs Petrolub winning an award for "Germany's most sustainable medium-sized company" in 2016, the German Lubricant Manufacturers Association (VSI), including Fuchs, Avia Bantleon, Klueber Lubrication and Zeller + Gmelin, is developing a standard specifically for evaluating the sustainability of lubricant suppliers with respect to carbon footprint, energy and water consumption, waste generation and other aspects.

Apu Gosalia, vice president sustainability & global competitive intelligence with Fuchs Petrolub, met with the board of directors of the Union of the European Lubricants Industry (UEIL) at the end of January to discuss what actions the association should take with respect to developing a sustainability standard.

"When it comes to regulations, the lubricants industry is often included with the mineral oil and/or chemical industry, but because we are at the very end of the value chain and our processes largely involve mixing and heating, we have some issues that are unique to our industry. It is important that the lubricants industry develops a sustainability standard specifically for the industry before some regulatory body establishes requirements that are unsuitable or impractical," Gosalia states.

Already in the EU, companies with more than 500 employees must prepare

"It is important today to be able to measure our performance"

APU GOSALIA
Vice president sustainability & global competitive intelligence, Fuchs Petrolub

a sustainability report for the fiscal year 2017 (to be reported for the first time in the beginning of 2018). Gosalia expects there will eventually be similar requirements for smaller companies as well. The EU Ecolabel for lubricants also has a sustainability component.

As importantly, sustainability has significant business and market implications; it impacts all aspects of a lubricant producer's business, according to Gosalia. "Number one is the reduction of the carbon footprint, both on a company level and as an industry. It is important today to be able to measure our performance in the respect, and Fuchs is in the process of developing tools for doing so."

Second, because the lubricant industry blends raw materials (base oils, additives, etc) from various sourcing partners, the sustainability of a lubricant producer will depend largely on the sustainability of those suppliers and their products.

"Seeking raw materials that are more sustainable - with lower carbon footprints that are perhaps renewable and of higher quality, for example – from suppliers that are committed to sustainability, is an important component of our sustainability initiatives at Fuchs," Gosalia observes.

Third, sustainability can impact sales and profitability. More sustainable lubricants can help end users improve their sustainability. "Whether in the automotive, energy, or other sectors, end users can benefit from lubricants that last longer, are more efficient, and/or are biodegradable – among many other possibilities," says Gosalia.

MARKET STRUCTURE **CYNTHIA CHALLENER** VERMONT, US

M&A ACTIVITY CONTINUES TO DRIVE CONSOLIDATION

MERGERS AND acquisitions among base oil and lubricant producers and distributors, the latter particularly in the US, are having a significant impact on a local level.

"We see two overall trends: the major oil companies are exiting specialties businesses, including base oils and lubricants, and in the current complex regulatory environment and highly competitive market, such as exist today, smaller actors find it challenging to survive and are often consumed by larger players," Nynas' Valentina Serra-Holm notes.

Fuch's Apu Gosalia adds that the activities of the major oil companies are providing increasing opportunities for independent players. Other drivers, according to Geeta Agashe, include increasing globalisation, a move to global specification platforms by the industrial and automotive OEMs, a desire to capture greater economies of scale, a desire to diversify across geographies to decrease risks, a desire to make the big even bigger, a desire to capture efficiencies and synergies, a demand by some of the larger customers (mining companies, automotive OEMs, primary metal plants, etc) to follow the same maintenance practices in all their global locations, and a desire to quickly bolster market share among others.

"Most importantly," she asserts, "consolidation in our industry is accelerating as participants look to build scale in a fragmented landscape. Strategic acquisitions have centred on expanding technology and engineering resources, broadening product portfolios, and diversifying into growing end markets."

Some of those participants, notes Gosalia, are new to the market. Private equity is also entering the lubricants industry.

In the base oils segment, joint ventures have been notable: SK with Pertamina and Repsol; Neste with BAPCO; Chevron with GS Caltex; and Saudi Aramco with Luberef, Motiva, and S Oil.

Globalisation is a real driver here. "These base oil suppliers can assure their customers base oils that can be sourced from multiple refineries in multiple locations with 'read across' capabilities, which has become a very positive selling point for them," Agashe says.

Lubricant marketers, meanwhile, are letting go of underperforming assets (ie Shell and ExxonMobil exiting some markets) or because they do not fit with the company's overall strategy (ie Suncor's sale of PetroCanada to Holly Frontier and Ashland establishing Valvoline as a standalone business).

> **"Consolidation in our industry is accelerating as participants look to build scale in a fragmented landscape"**
>
> **GEETA AGASHE**
> President, Geeta Agashe & Associates

Players like Fuchs, on the other hand, have grown dramatically through strategic acquisitions of many of these divested assets.

There is also significant consolidation occurring in the distribution segment of the value chain. Many larger jobbers/distributors are buying smaller players, with, according to Agashe, approximately 70 deals having been closed in the past 20 years in the US alone by just five leading distributors: PetroChoice, RelaDyne, Pilot Thomas Logistics, Brenntag and Flyers Energy.

Many of the smaller firms that have been swallowed up served local geographic markets – consolidation grows their area of influence. The need for smaller, family-owned distributors to sell to either strategic of financial buyers when the next generation is not interested in taking over the business may also be a factor. In addition, when crude prices fell further than lubricant prices, these firms became more attractive.

Some of this activity has been funded by private equity, which often comes in with stronger IT and management systems and can achieve greater efficiencies, says Agashe.

"The US has always led the way in the lubricants industry, such as with Group I rationalisation, production technology upgrades, etc. It is possible, therefore, that we will see similar consolidation of the distribution segment in other parts of the world in the coming years," Serra-Holm notes.

"In my opinion," adds Agashe, "we will continue to see a heightened M&A, joint venture, alliance, divestiture environment in all segments of our industry. We are only at the beginning."

» Despite the oversupply situation and the closure of 2.6m tonne/year of Group I capacity in the past two years due to supply-demand mismatch, technical obsolescence, declining supply of "lube friendly" crudes, or changes in refiner strategies, base oil capacity is expected to increase significantly in the next few years, according to Agashe.

GRASSROOTS EXPANSIONS

"Even though many projects have been cancelled or postponed (close to 4.5m tonnes/year) due to the oversupply situation, the negative impact of low crude prices on new investments and the impact of sanctions on Russian refiners, a number of planned capacity additions/new facilities are still on the books and expected to be operating by 2020," she says.

These include huge projects by ExxonMobil in Rotterdam, Luberef in Yanbu, Panjin N Asphalt in Panjin, Hengli Petrochemical in Dalian, Hainan Handi in Hainan and many others in Asia and Russia. If all of them go forward, base oil capacity will increase by close to 10m tonnes/year. "

Against flat demand that creates a sobering picture," Agashe notes. "The most likely impact on the market will be tierisation of base oil suppliers."

What is driving these investments in an oversupply situation? Agashe points to several possible reasons: the addition of Group III base oil production from diesel hydrocracker bottoms to improve the overall economics for large diesel refineries; construction in geographies where base oils are currently imported and that have waxy crude as an ideal raw material; to meet overall corporate strategic objectives; and in some cases due to geopolitical considerations.

> **"Base oils prices are likely to increase, but it is uncertain whether producers will benefit due to the increased cost of capital they will face"**
>
> **VALENTINA SERRA-HOLM**
> Marketing and technology director, naphthenics, Nynas

There is another impact of these recent closures and capacity investments beyond the shift away from Group I to Groups II/III that will be further magnified if all of this additional capacity is realised: the shift of production from the EU and the US to Asia and the Middle East.

In 2016 alone, 12,000 and 14,200 barrels/day of new Group II capacity and 12,300 barrels/day of mostly Group III capacity were respectively added in China, Saudi Arabia and the UAE, according to Serra-Holm.

"These changes in regional base oil capacities and local demand are creating new dynamics in the global market," asserts Outhwaite.

In the end, Agashe concludes that "those suppliers that are more sustainable and have 'read across' their multiple refineries, have all the necessary approvals in place, collaborate with additive companies and offer more economical logistics solutions will win the day." ■

Cynthia Challener is a freelance technical writer, editor and market researcher specialising in topics related to the chemical and allied industries

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Russian lube oil demand on the up

Russia's two dominant base oil producers, Lukoil and Rosneft, have been investing in an effort to produce more value-added products from their refineries. The effect is being felt in eastern Europe and the CIS states

CUCKOO JAMES LONDON

A move towards high-end, premium oil products and a renewed focus on domestic markets in Russia could bring about changes to the wider eastern European base oils industry in the coming years.

Russia's president Vladmir Putin has executed a "big tax manoeuvre" in recent years to reorganise the country's refining industry. The government has also introduced higher export taxes on fuel oil to steer refiners away from production of the heavier grades and towards output of lighter, premium products.

The move has in effect encouraged Russian oil companies to take on massive refinery upgrading commitments. Many of these "maintenance" projects were undertaken in 2015 and 2016.

In addition, excise duty – a form of inland tax – on many oil products was pushed up to support government coffers in the wake of the oil price crash. This has dented the refinery margins of Russian companies in recent months.

REFINERY MARGINS ARE DOWN

Russian oil major Lukoil's total production volumes of refined products fell for the first nine months of 2016 compared with the previous year as a result of the poorer margins.

Lukoil said during the announcement of its third-quarter results: "In Russia, our produc-

Dacology/Alamy Stock Photo

Russia plays a major role in the eastern European base oils market

tion volumes decreased by 1.4% due to throughput optimisation as a result of a general weakening of refining margins in Russia driven by excise tax increases in January and April 2016."

Lukoil says it has completed essential refinery upgrades. "[The] launch of new secondary processing units in 2015 and 2016 enabled us to substantially enhance our refined product slate by reducing production of fuel oil and vacuum gasoil in favour of light products," it noted.

Lukoil's production of fuel oil fell to 4.2m tonnes in the first nine months of 2016 from 6.0m tonnes over the same period in 2015.

However, its motor oils production in Russia rose from 681,000 tonnes to 767,000 tonnes during the timeframe because of the push towards value-added products. Excise duty paid on motor oils also fell, unlike for other oil products. Lukoil revealed that the sales volumes of its premium branded motor oils and industrial oils rose by 30% from last year.

Lukoil's share of lubricants production in Russia is typically 45% of total national capacity at 1.2m tonnes/year, of which only 30,000 tonnes/year is Group III base oils. Average base oils sales volume is 600,000 tonnes/year, with the rest used in formulations of the company's finished lubricants.

BALTIC DIVESTMENTS

The company's base oils exports for the whole of last year are yet to be estimated, but there could be some negative impact from its divestment of retail outlets in the Baltics and Poland early this year. Lukoil sold approximately 230 petrol stations in Poland, Latvia and Lithuania.

Regarding its overall motor fuel sales, it said: "During the first nine months of 2016, retail sales outside Russia decreased to 3.1m tonnes, or by 8.7%, mostly as a result of divestment of our retail networks in Poland and the Baltic states." Its wholesale exports are also down.

On the other hand, its domestic wholesale and retail sales volumes rose. Some estimate this shift to the domestic market could have been a consequence of US sanctions. However, specific export figures on base oils when we get our hands on them might tell a different story.

Meanwhile, Rosneft – Russia's second biggest base oils producer, with an output of 500,000 tonnes/year of base oils – has multiple projects underway to extend its lubes presence in the Russian market. These include TV, radio and outdoor advertising campaigns and agreements with major domestic businesses to substitute imported lubricants with its products.

In 2015, a lube sales development programme was launched to sell lubricants at official Avtovaz service stations.

Andrey Rudakov/Bloomberg via Getty Images

Lukoil has been upgrading its refineries and has increased motor oils production

Russian base oils supply is important for the wider Commonwealth of Independent States (CIS). Lukoil and Rosneft are the largest producers in the region, which accounts for 6-8% of global base oil capacity. Polish refiner PKN Orlen has a production capacity of 300,000 tonnes/year. Refinery run rates at the plants can vary considerably.

"Operating rates for base oil refineries can vary depending on a set of factors," says Anuj Kumar, project manager at consultancy Kline & Co. "In some cases it could be as low as 60%, while well-run refineries can register rates of 80% to 85%. The average operating rate for Group I refineries ranges from 65% to 70% currently."

> **"The Russian market has slowly picked up consumption of premium base oils since multinational blenders have started using these base oils"**
>
> **ANUJ KUMAR**
> Project manager, Kline & Co

Kline & Co estimates that Russia exports about 600,000-650,000 tonnes of base oils every year, mostly via the Baltic states. It exports not only to the wider eastern European region, but also to western Europe largely via spot contracts. Other key destinations are west Africa and northern Africa.

It also sends product to Latin America and Asia. Exports are dependent on economic growth in these countries.

"The export market depends on the EU economic performance, as well as emerging markets such as west Africa, India and Brazil," says Kumar.

Apu Gosalia, vice president, sustainability and global competitive intelligence, at Fuchs Petrolub, points out that 90% of capacity in eastern Europe is Group I.

GROUP II SWITCH IS SLOW

"Switching to Group II formulations is a time-consuming process and may result in reformulation costs as well," says Kumar.

Trade in Group II and III base oils is low in the region. "Russia imports small quantities of these base oils to meet its blending requirements," Kumar says. "Most of the premium oils required by newer cars are imported from west Europe. Consequently, it creates demand for premium base oils in west Europe," says Kline.

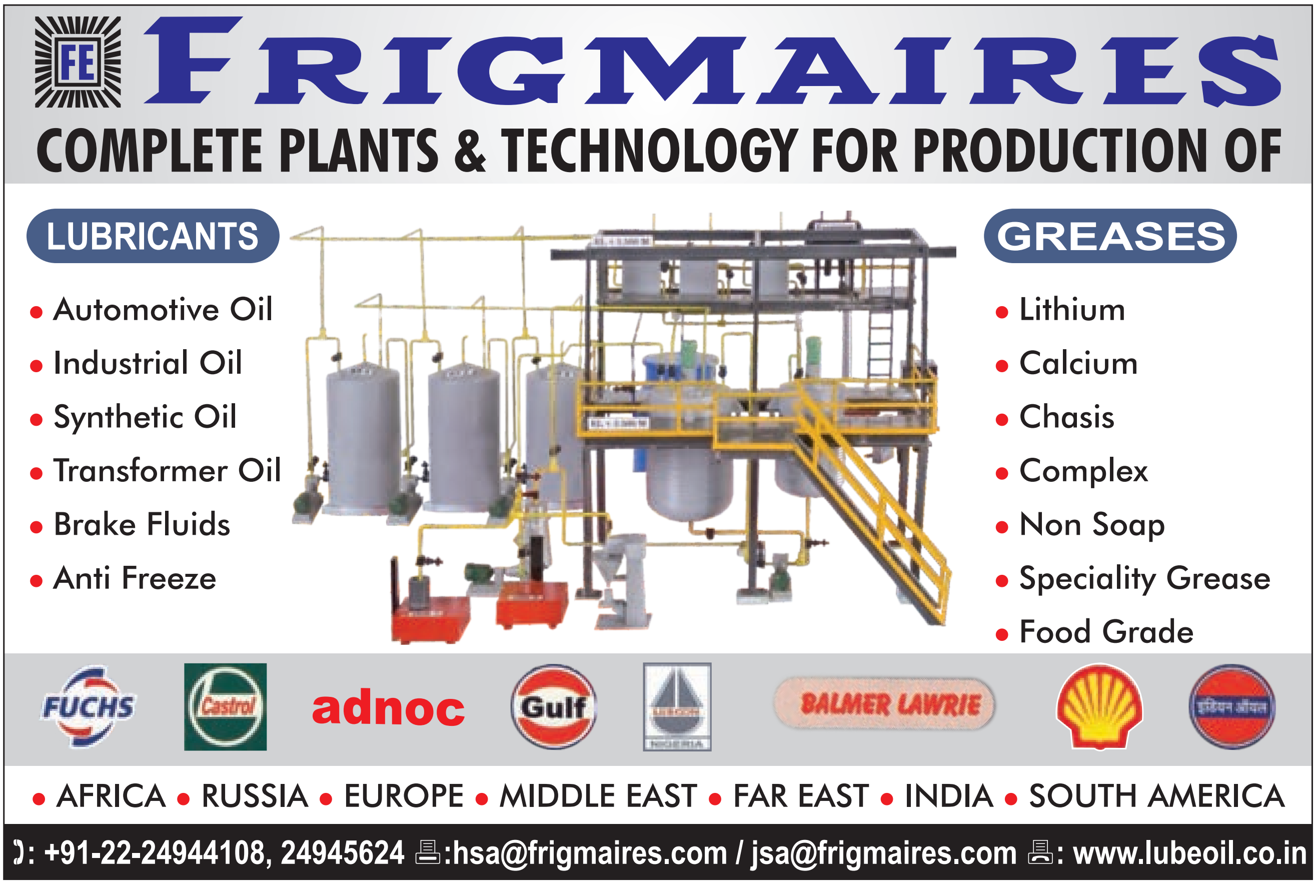
"There is room for greater demand for premium base oils. In response to this, there have been some announcements to set up Group II/III facilities in the country," Kumar says. "The Russian market has slowly picked up consumption of premium base oils since multinational blenders have started using these base oils to produce finished lubricants. However, over the past two years the volumes have stagnated due to the weak economic performance."

"There are isolated cases where countries with large expat communities – [that is,] the Balkan states – have had higher finished lube consumption rates than GDP growth rates due to the second hand car imports," says Kumar.

Otherwise, consumption in the region has traditionally been below GDP. Car ownership is certainly helping base oils consumption growth, but that trend is more prominent in the EU countries than in the CIS.

Kumar says: "EU's eastern European members are boosting finished lube consumption through second hand car imports from northern Europe. The CIS new car and second hand car markets have remained sluggish." ■

Cuckoo Susan James is a senior editor for crude futures and refined products at ICIS, based in London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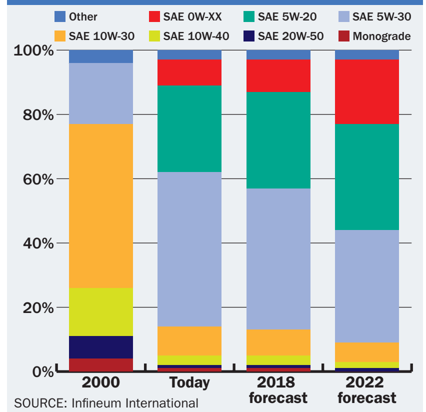
Consumer vehicle oils are shifting to lower viscosities

Getty Images

NORTH AMERICAN LIGHT-DUTY ENGINE OIL VISCOSITY TRENDS



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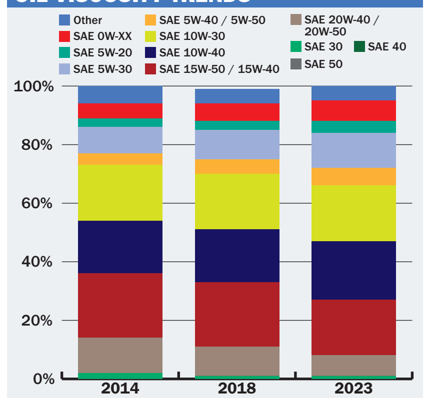
ASIAN LIGHT-DUTY ENGINE OIL VISCOSITY TRENDS



SOURCE: Infineum International

Driving down viscosity

The trend to lower-viscosity engine oils is set to continue. Chris Locke of Infineum looks at what's happening in Asia and the US and the impacts on base stock demand

While trends in lubricant viscosity grades are hard to predict, the fuel economy improvements that can be gained from using thinner engine oils, with reduced hydrodynamic friction, means we expect the shift to lower viscosity to continue.

Legislation to improve fuel economy and reduce carbon dioxide (CO_2) emissions is being introduced or tightened across the globe, further driving the move to thinner and thinner engine oils.

Over the past 15 years in North America, we have seen the light-duty market move from around 50% SAE 10W-30 to almost 50% SAE 5W-30 today. That might seem like quite a slow change, but vehicle population age and OEM (original equipment manufacturer) market share both impact viscosity grade trends, which is why it can take a considerable amount of time for new viscosity grades to make up a significant portion of the overall market.

While SAE 5W-30 is now the most popular grade in North America, it took from the late 1980s until 2006 for it to rise to this top market-share position. In our view, it will take a long time for it to exit the market – despite the fact that SAE 5W-20 and 0W-20 are now the most widely recommended grades for new cars.

While future trends are tough to call, we expect the thinner 0W grades to account for about 20% of the market by 2022, with the once popular SAE 10W-30 and heavier grades pushed right out to somewhere around 12% – quite a shift.

The introduction of SAE 0W-16 in North America with International Lubricants Standardization and Approval Committee (ILSAC) GF-6, expected sometime in 2018, means this grade is likely to displace SAE 0W-20 in this region as opposed to 5W-XX or higher grades.

FRAGMENTED ASIA MARKET

In Asia, the market is much more fragmented. In the light-duty market, the picture is quite different from that in North America, where today SAE 5W-30 and lighter grades account for over 80% of the market. In Asia, these grades account for only about 20%. And,

although some growth in these very light grades is expected, they will still hold only around 25% share of the market by 2023.

Just as we have seen in North America, the shift to lower viscosity in Asia is being driven by the desire for fuel economy and is being enabled by the increased availability of higher quality Group II, III and even Group III+ base stocks. However, while the shift to lower viscosities is happening quite quickly for factory fill oils, end-users are only slowly adopting these grades as service-fill oils and this continues to limit their penetration.

When we talk to base stock suppliers in Asia, they predict a slow growth for viscosity grades using Group III, but much larger growth for grades and quality levels that can use Group II.

While many OEMs suggest SAE 0W-20 and 5W-20 will continue to meet their needs, some Japanese OEMs are already driving the introduction of ultra-low SAE viscosity grades to capture further fuel economy benefits.

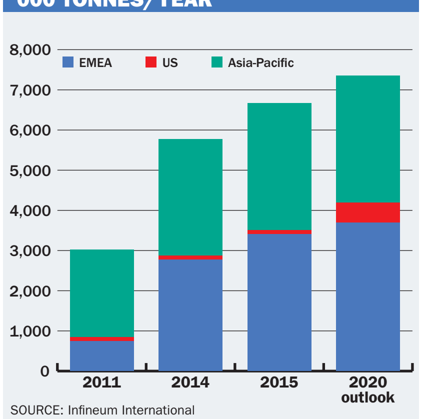
> **"Although the trends are tough to call, we expect the thinner 0W grades to account for about 20% of the market by 2022"**

SAE 0W-16 oils are emerging, and some OEMs are looking to go even lower. SAE has now approved the definition of SAE 0W-8 and 0W-12, defining new limits for engine oils built for even better fuel economy, which means the move to low-viscosity grades may accelerate.

HEAVY-DUTY DIESEL TRENDS

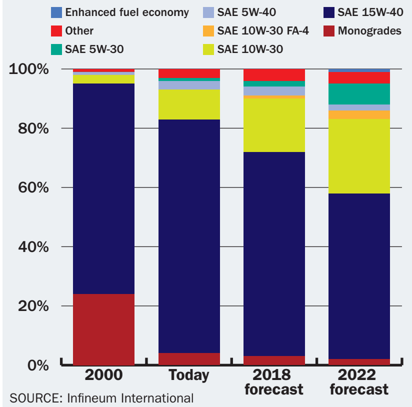
The trend to lighter viscosity can also be seen in the North American heavy-duty diesel (HDD) market. The desire for fuel economy here is driven both by end-user demand for lower operating costs and by greenhouse gas legislation. To meet these requirements, OEMs have introduced new hardware and begun to look at lower-viscosity lubricants.

GLOBAL GROUP III CAPACITIES, '000 TONNES/YEAR



SOURCE: Infineum International

NORTH AMERICAN HEAVY-DUTY ENGINE OIL VISCOSITY TRENDS



SOURCE: Infineum International

This means monogrades have almost completely disappeared from the market. And, although SAE 15W-40 will remain the mainstay grade for the foreseeable future, sales of SAE 10W-30 have doubled in the past five years.

Now that Proposed Category 11 (PC-11) has been approved, we expect this trend to continue and can accelerate in the near term. Looking further ahead, although it is likely that we will see more uptake of low-viscosity oils in HDD applications, Infineum believes limited back serviceability may impact the uptake of the new lower-viscosity API FA-4 oils.

In Asia, we see a similar highly fragmented picture in the heavy-duty market as reported for consumer vehicles. Here, as in North America, SAE 15W-40 is the mainstay grade in these applications. However, the uptake of lower-viscosity grades is much slower. While the use of monogrades will decrease slightly in the coming years, we do not expect there to be any significant growth in the use of SAE 10W-30 or lighter grades.

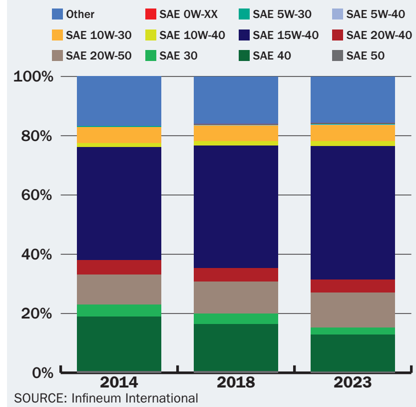
IMPACT ON BASE STOCKS

As the value of improving fuel economy to reduce CO2 emissions and running costs becomes increasingly important, a continued move to lower-viscosity lubricants seems inevitable. To produce these products, the need for high-quality base stocks with lower viscosity, higher viscosity index (VI) and lower volatility will increase. This means the pace at which the markets move to lower-viscosity lubricants will be influenced by the availability and cost of high-quality base stocks.

Right now, the Group III market is long. Capacity from the Repsol-SK Cartagena refinery in Spain and Takreer's refinery in Abu Dhabi is already on stream. This, combined with future volumes from Russia and North America, means there should be plenty available to meet the anticipated demand for premium products.

Current Group III base oils should be fit for purpose to formulate SAE 0W-16 and 0W-20 viscosity grades with volatility performance in

ASIAN HEAVY-DUTY ENGINE OIL VISCOSITY TRENDS



SOURCE: Infineum International

line with general industry specifications. In addition, unmet demand capacity for Group III offers base oil suppliers an opportunity to consider manufacturing Group III+, where economically viable, in order to differentiate themselves even further.

However, the introduction of ultra-low viscosity oils or lubricants with tighter volatility requirements will require very high VI or low viscosity poly-alphaolefin (PAO) base stocks to maintain performance. It is not clear if there will be enough

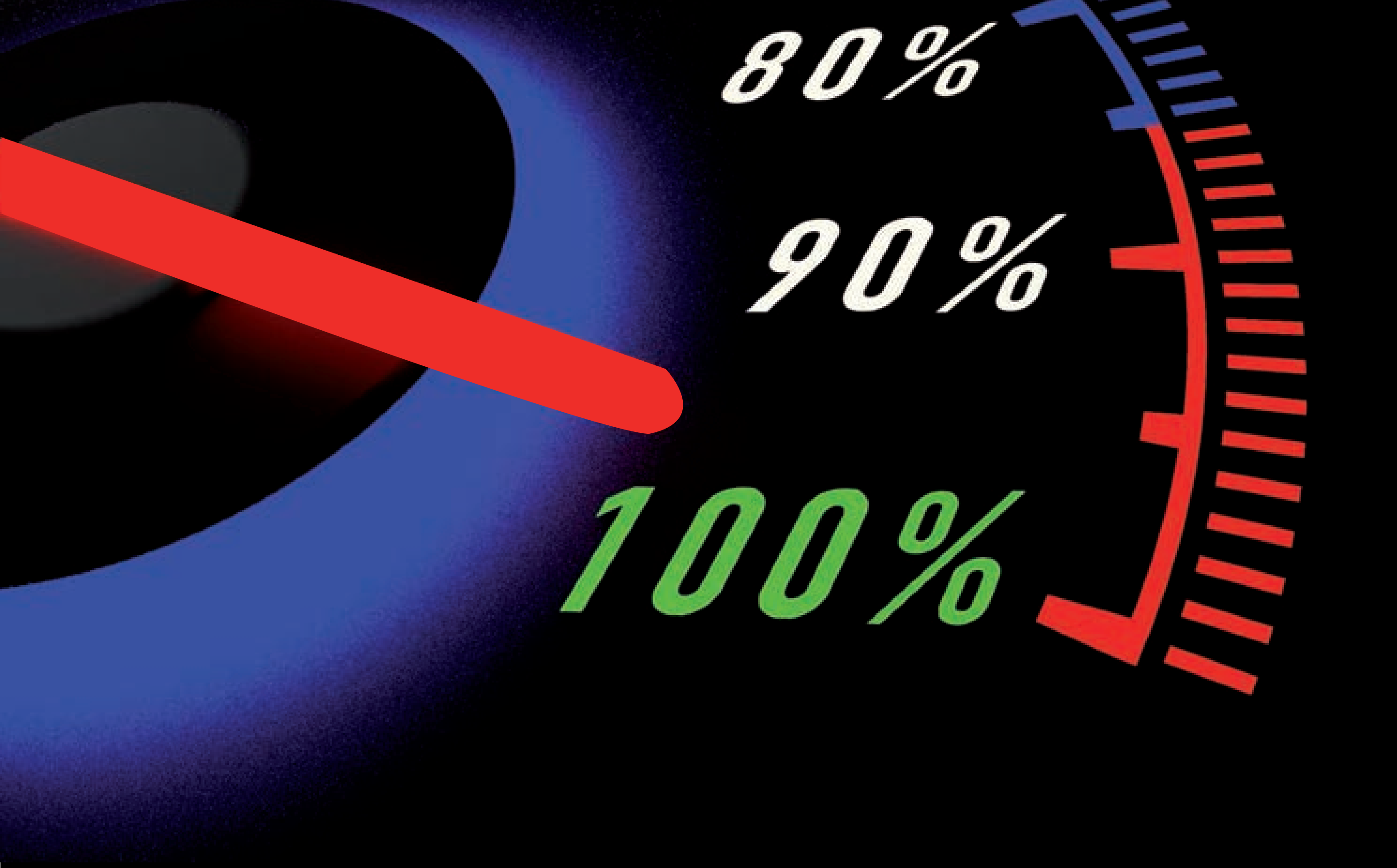
> **"The... move to lower-viscosity lubricants will be influenced by the availability and cost of high-quality base stocks"**
>
> **CHRIS LOCKE**
> Executive vice president, marketing and technology, Infineum

of these products to meet demand, which Infineum believes could increase investment challenges for all stakeholders.

We can expect regional quality demands to drive an increase in the global movement of high-quality base stocks. However, this is a very complex area and the rate of growth of high-quality base stock demand is inexorably linked to the change in the vehicle population. While new cars with high-specification lubricants will replace older cars using lower-specification lubricants, this will be a slow process.

All this uncertainty means the growth of these low-viscosity grades and their impact on base stock demand over the next decade is very hard to predict.

Dr Chris Locke is executive vice president of marketing and technology at Infineum. For more information on Infineum, go to **www.InfineumInsight.com**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PHILLIPS 66 BASE OILS

Chevron established its first European base oils hub in Antwerp, with storage facilities operated by Noord Natie

Qualifications and supply chain are key

This year, Chevron celebrates 10 years of development of its European Group II base oils presence. Product quality, technical qualifications and an effective supply chain are essential elements in its approach to the market

JOHN BAKER LONDON

Chevron's announcement at the end of last year that it is adding a fifth hub in Europe for Group II base oils import, storage and distribution is a sign of how positively the company views market development in the region.

Located in Le Havre, France, and owned and operated by LBC Sogestrol, the facility will allow Chevron to offer customers along the river Seine a shorter supply chain.

"With regular, reliable delivery, customers can minimise their base oils inventory while blending higher-performing lubricants," Chevron noted in its announcement.

Initially, grades held at the facility will include Neutral Oil 100R and 220R. Neutral Oil 600R tankage may be added later.

The investment marks 10 years of activity in Europe for the US Group II base oils producer, which made its first investment within the region in 2007 with the opening of its first hub in Antwerp, Belgium. Over the past decade, it has added further hubs in Hamburg, Germany, Liverpool, UK, and most recently Istanbul in Turkey, as demand for its premium grade materials has grown.

"We have quite a footprint in Europe now," notes Alan Outhwaite, manager of base oil business development for Europe. "We have a strong technical story [with our high-specification product], but the logistical network is a key strategic requirement. Our customers, lubricant blenders supplying into the automotive sector and industrial sectors, are under pressure to »

deliver on time and at low cost."

Chevron made the decision to target the European market in conjunction with its commitment to expand Group II capacity in the US by building a $1bn facility in Pascagoula, Mississippi. This came on stream in 2014, complementing its existing facilities in Richmond, California, and a joint venture plant in Yeosu, South Korea, taking global capacity to nearly 60,000 bbl/day.

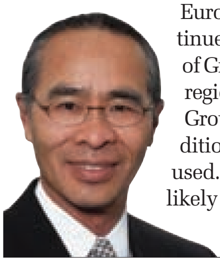
GLOBAL BASE OIL SLATE

All three plants offer the same Chevron base oil slate, enabling customers to use the same approved formulations in various geographies with different Chevron supply sources. This simplifies formulation complexity and greatly improves supply reliability, says Chevron.

"Europe has been a major investment for us in terms of people and specifications," says Brent Lok, manager, marketing and business development at Chevron in North America. "It was driven by Chevron's decision to invest in Pascagoula and the identification of Europe as a key location for the use of Group II base oils."

The move has proved a success story, he adds, with volume sales beginning steadily and now really picking up. "The reception by customers, and we have over 100 of them now, has been very positive. Our Group II products are a very nice fit for Europe, where high-tier specifications are leading the way."

Europe, he adds, will continue to be a net importer of Group II base oils as the region moves away from Group I, which it has traditionally produced and used. The situation will likely change, however, when ExxonMobil brings onstream a new Group II facility in its Rotterdam refinery in the Netherlands around late 2018 or early 2019 and "the market will move into a new phase", Lok says.



"Europe really values our products and so if customers need the product we will ship it to them"

BRENT LOK
Manager, marketing and business development, Chevron

While there is still plenty of Group I availability in Europe, demand will continue to decline steadily. Once there is a second major supplier in the market, argues Lok, the pace of decline may well increase as suppliers will be happier to switch to Group II once they have a credible alternative supply source and even greater certainty in the supply chain.

Lok and Outhwaite both stress the importance of offering an efficient and reliable supply chain when it comes to serving customers across Europe. In many cases, says Lok, supply chain issues can drive decision making by formulators as to which base oils to use.

"The issues are very complex and a number of factors have to be juggled – but if customers make a wrong decision they can end up with higher costs [mainly as they have to hold larger inventory as they are not able to rely on timely deliveries]," he explains. Hence, the investment in the local hubs across the region.

Outhwaite adds: "We work very closely with our customers to help them meet their formulation requirements. One of our key competitive differentiators in Europe is that we undertake a lot of specification approval work with additive suppliers, so that lubricant users do not need to invest time and money to do this themselves.

"We now have an extensive portfolio of product qualifications, the use of which can save several millions of dollars of development costs for our customers."

In terms of customers, he adds, the automotive sector is key and largely drives discussions and helps justify inventorying of our base oils, but then there is a cascade possible to a wide range of industrial and other lubricant applications. "We have enabled our customers to develop some really good end-products to take to their clients," says Outhwaite.

FLEXIBLE SOLUTION

Lok points out that Chevron's Group II base oils can be used in over 90% of a blend plant's formulations, making them a flexible solution for a wide range of technical needs. In many cases, he says, they are backward compatible in that they are capable of being used in conventional Group I applications as well as many formulations where the use of Group I is no longer possible.

In the 10 years Chevron has been active in Europe, adds Lok, the use of premium base oils, including Group II, has moved from niche applications to the mainstream. "When we came in, we were a novelty and customers were not sure where [our products] fit into their portfolio. This is not an issue now."

Now, customers are more concerned about how to optimise the supply chain and their formulations. There is, adds Lok, a lot of emphasis on the total cost of ownership and Chevron has worked closely with all customer types to show how Group II base oils can be used efficiently.

Chevron focuses primarily on engagement with additive and lubricant suppliers, but also occasionally seeks to influence OEMs. "Our base oil team has", says Lok, "very little direct contact with the end lubricant customers." The key issues that always come up, he notes, "are quality and availability".

In terms of supply into Europe and the global Chevron network, which was recently enhanced by the opening of further storage and distribution hubs in South Africa and Brazil, Lok indicates that the company is now focusing its marketing efforts on where the demand is greatest.

"We are upgrading our portfolio these days. Europe really values our products and so if customers need the product we will ship it to them," he says.

"Chevron recognises its leadership role in the supply and marketing of base oils and has the technical knowledge to bring value. We are constantly looking at our assets to see if we need to upgrade them or increase capacity," Lok adds. At the present time, however, he declines to say whether any such decisions are imminent.

"One of our key competitive differentiators in Europe is that we undertake a lot of specification-approval work"

ALAN OUTHWAITE
Manager, base oil business development for Europe, Chevron

The main emphasis at present is to make sure the 15 global supply hubs are optimised to meet customers' needs. It is, he thinks, unprecedented to have five hubs to serve the European market.

Further afield, Chevron is seeing fairly sizeable growth in premium base oils in markets such as Brazil, South Africa and the rest of Africa, Asia and Australia.

Lubricant specifications are changing – especially in heavy-duty areas – and OEMs are going for global specifications. This, and automotive emission-control regulations, explains Outhwaite, are all driving the move to Group II and III base oils as formulators cannot use Group I to achieve the technical requirements.

The result, he concludes, is that while overall base oil markets are seeing only moderate growth globally, Group II materials are enjoying higher growth levels as they penetrate the market by displacing Group I. Europe is a prime example of this, adds Lok, making it a focus for Chevron at the present. ■

For more details on Chevron's base oils business, go to: **www.chevronbaseoils.com/**

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The future is electric!

Electric and hybrid vehicles are making inroads into the automotive market as battery technology improves and environmental concerns grow, with long-term impacts on base oil demand and usage

CUCKOO JAMES LONDON

In 1904, the first underground subway line opened in New York. Above ground, electric cars already accounted for one-third of all US automobiles. A succession of discoveries in the 1800s – such as the battery and the electric motor – had propelled the new technology into the homes of affluent Americans.

Sales soared and the noiseless cars continued to be in demand for the next 10 years. So much so that the prolific Thomas Edison confidently set out to create an improved version of the electric vehicle battery.

If anyone cared for them, there were steam and gasoline cars on the market too. The stage was set for the rise of the electric vehicle.

But Edison's friend – and competitor – Henry Ford had other ideas. Ford's mass-produced, gasoline-powered Model T was soon introduced at a more affordable price. The automobile could now be part of the rural home. Gasoline was cheap, thanks to the concurrent Texas oil boom, which came right on the heels of the Pennsylvania oil rush. The commercial electric vehicle died a premature death as the US entered the oil age.

It sputtered back to life briefly in the 1970s at the time of the Arab oil embargo. But it is only since 2000 that the electric car has consistently hit headlines for its environmental benefits, as fresh life was breathed into it from all directions.

National governments are seducing their populations back to the humble electric vehicle. In the US,for instance, buyers are offered a federal tax credit for purchasing one. Policy makers in China and India are providing purchase rebates and tax exemptions. Sweden is offering five years of road tax exemption.

"Most experts are saying that hybrid vehicles penetration is going to be faster than electric vehicles"

BILL DOWNEY
Senior vice president, business development, Novvi

More importantly, from the consumers' point of view, owning an electric car has become a status symbol. Car maker Tesla succeeded in making the electric car an object of desire, with celebrity owners like actor and environmentalist Leonardo di Caprio drawing attention to it. Tesla's model S is a refined, red hot version of the electric car complete with self-driving functionality. It comes packaged with a home charging installation and access to the firm's expanding supercharger network.

ADOPTION IS BESET BY PROBLEMS

Is that enough for widespread uptake? Carl Larry, consultant at research firm Frost and Sullivan, is quick to point to the US government's underlying lack of will to push the electric car forward. "Here in the US, the outlook for EVs [electric vehicles] is not even close to as good as most would think. There is a lack of infrastructure to build-out charging stations and that is the biggest hurdle in front of us."

The International Energy Agency (IEA) seems to agree with him. Tax credit or not, it estimates that although the US is the second largest market after China, electric cars would come to constitute only 8% of total light duty vehicle (LDV) stock in 2040 – a far cry from the 38% penetration in 1900.

"Higher uptake is held back by lower gasoline taxes, which limit the possible fuel »

» cost savings from EVs, and vehicle sizes that are larger than in any other region," the IEA said in its "World Energy Outlook 2016".

If you zoom out to see the bigger picture, the global stock of electric cars increases rapidly from 1.3m in 2015 to over 30m in 2025, and to about 150m or 8% of global car fleet by 2040. The momentum is held back only by the time required to recoup the high investment cost, although battery costs fall to less than half of today's level. Deployment is faster if there is additional policy support, with penetration at 710m in 2040. In China, one out of nine cars could be electric by 2040. It is the largest market for new electric vehicles from now until then, the IEA says.

The IEA clarifies that the impact on oil consumption is limited. Its first scenario would displace 1.3m barrels of oil by 2040 and the second 6m. Around two-thirds of the 150m electric vehicles would be plug-in hybrids, which is good news for base oils. Plug-in hybrid cars are the best of both worlds. They include an electric motor, but also an internal combustion engine, which demands lubricant use.

William Downey, senior vice president of business development at Novvi, says it is important to keep the distinction between electric and hybrid cars in mind while talking of base oil consumption. Electric vehicles have no need for engine oils. "Most experts are saying that hybrid vehicles penetration is going to be faster than electric vehicles," he says.

"With hybrid vehicles you still have an internal combustion engine. Typically, the lubricant it uses will be of lower viscosity and higher performance."

Lubricant providers need to work closely with original equipment manufacturers (OEMs) to come up with the right kind of base oil necessary to produce premium brands for hybrid vehicles. "OW-20 is what we are seeing as the typical grade that would be used in a hybrid vehicle," Downey says.

Premium lubricants necessitate the use of a different grade of base oil. For ordinary engines, formulators can use a Group II, III or both, but not for hybrid vehicle engines. This alone can trigger change and fresh opportunities. "You can't do a OW-20 with just a Group II or a Group III, you need a Group III plus or a high-performance synthetic base oil," Downey says.

An electric car also offers opportunities for base oils producers. All electric vehicles have a battery, which needs maintenance. "When we talk to oil suppliers, they are concerned. They see [electric vehicles] as a negative. Our view is that it is an opportunity. There are some unique fluids that OEMs are looking at for cooling the battery pack. Specialty fluid for battery pack cooling is an opportunity for companies," Downey says. ■

Cuckoo Susan James is a senior editor for crude futures and refined products at ICIS, based in London

Brightstock supply eases in Europe

While Group I SN150 and SN500 grades are in relatively short supply in Europe right now, brightstock availability is healthy, with prices softening at the start of the year

SARAH TRINDER LONDON

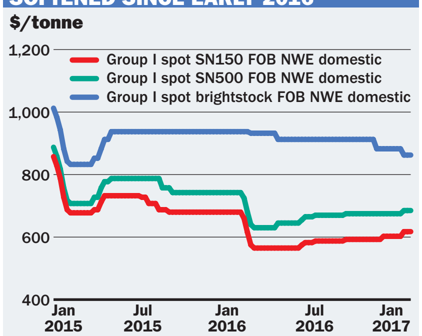
The European Group I base oils market got off to an unexpectedly bullish start in 2017 amid continued tight market supply of SN150 and SN500 grades. Issues at certain European refineries towards the end of 2016 brought about tight market conditions which have carried over into the start of 2017.

Although issues at the refineries are thought to have been resolved, some refiners say they are focusing on increasing inventories and covering contractual obligations and will not be back in the spot market until February or March.

Domestic European SN150 and SN500 prices firmed at the start of 2017 because of the limited availability of both grades, with players on the European export market negotiating at levels above the ICIS European export highs.

Conversely, brightstock remains healthy in availability, with price decreases seen by the majority of sources. As a result, domestic and export prices for brightstock have come down, with lower prices still noted on the export market.

EUROPEAN BRIGHTSTOCK PRICES HAVE SOFTENED SINCE EARLY 2016



SOURCE: ICIS

One market player says that strong demand from the Middle East, India and East Asia should underpin brightstock prices and limit decreases. However, other players believe that healthy supply and a lack for demand for brightstock from Nigeria means that price drops are to be expected.

CAPACITY CLOSURES

The current scenario is worlds apart from market expectations following a spate of Group I capacity closures in Europe over the past few years, brought about by increasing market share of Group II and Group III base oils. There were two large Group I capacity closures towards the end of 2015 and the start of 2016.

The first was the Kuwait Petroleum unit located in its Europoort refinery in Rotterdam. The refinery was sold to Gunvor, which ceased operating the site's base oil, wax and bitumen production by the end of December 2015. The refinery had a base oil capacity of 235,000 tonnes/year.

Shell also closed the base oil unit at its Pernis refinery, also in the Netherlands, which had a capacity of 370,000 tonnes/year, at the same time. These followed other capacity closures or rationalisations, such as the base oils unit at the Colas refinery in Dunkerque, France, in April 2015, and Total closing half of the base oil capacity at its Gonfreville, France, refinery in November 2015.

Group I capacity closures in 2015 amounted to a loss of around 1.5m tonnes/year according to one market player. This left most people expecting brightstock to become extremely tight in supply and even becoming a niche product further down the line. Bright-

stock is unique in that there are no grades in the other groups with an equivalent viscosity.

Evidently, this has not been the case, with the market surprised by the gradual tightening of supply of SN150 and SN500 and lengthening of brightstock. Players have attributed this lengthy supply of brightstock to a number of factors.

First, it is suggested that producers have maximised brightstock production in the expectation that prices would soar amid the expected tight conditions. Second, buyers are said to have covered their needs in advance of the closures amid suggestions of a tight market supply to come, therefore needing less spot material later on. Third, a lot of European brightstock tended to go to countries in Africa, Nigeria in particular, but demand has dropped from this country amid credit issues, making deals difficult to finance.

Whether brightstock remains widely available for the rest of the year remains to be seen, but sources do tend to see limited supply of SN150 and SN500 as an ongoing situation, at least during the first half of the year, especially with the seasonal refinery maintenance season due to take place in the coming months.

The Baltic and Black Sea export markets have also experienced tight conditions on SN150 and SN500 in recent months, with one major refiner not offering export volumes towards the end of 2016 and others said to be focusing volumes on the domestic Russian market.

Sources do tend to see limited supply of SN150 and SN500 as an ongoing situation, at least during the first half of the year

Prices increased in both the Baltic and Black Sea export markets as a result of the aforementioned tightness but there was some slight erosion as conditions seemed to balance out more at the start of 2017.

However, opinions differ on price trajectory in the two regions, particularly in the Baltic. Some believe that more balanced supply and unexceptional demand mean that prices should decrease as the year moves on.

Elsewhere, others see prices reaching levels above those seen on the European export market, buoyed by firmer feedstock costs and what they see as tightly supplied market conditions in the Baltic.

The Black Sea market had been fairly illiquid during 2016 but towards the end of the year, the absence of a major supplier to the region had resulted in extremely tight market conditions and prices increased as a result.

Supply has since improved, with the market quiet following the annual licence renewal process taking place in the key Turkish market. Values for SN150 have shown signs of softening in the region on the back of healthier availability, but again, price trajectory going forwards is unclear.

Group II and Group III base oils are set to increase in market share going forwards amid the need for lighter viscosities

The seasonal refinery maintenance season is set to take place during the second quarter of this year so this could lend support to firm prices in the Baltic and Black Sea export market but this depends on how strong market demand is.

On the other hand, supply of both Group II and Group III base oils in Europe is healthy, particularly so for the latter. New Group III capacity come onstream during the first half of 2016, with Abu Dhabi National Oil Company (ADNOC) opening its 500,000 tonnes/year Group III and 100,000 tonnes/year Group II plant in Ruwais, Abu Dhabi. As a result, supply of Group III and Group II base oils increased in Europe, with prices there decreasing as a result.

Additional Group III base oil supply in Europe was also noted from Russia towards the end of 2016 and in early 2017. Although this material is unapproved by original equipment manufacturers (OEMs) and therefore not suitable for all buyers in the market, it is said to be of good quality and has put pressure on Group III prices amid an abundance of material.

INCREASED PRODUCTION

Russian refiner Gazprom Neft is planning to begin producing increasing amounts of primarily Group III but also Group II base oils at its refineries. A company source said that by 2020 it expects to be producing Group II and Group III base oils at the Omsk refinery, with the capacity for these products ultimately increasing to 300,000 tonnes/year.

Group II product also remains healthy, with product being supplied from within Europe and also via the US. However, with Europe thought to be a net short on Group II base oils, it is likely that the region will continue to rely on imports.

Group II and Group III base oils are set to increase in market share going forwards amid the need for lighter viscosities and regulation-driven changes in engine and transmission designs which merit new approaches to finished lubricants.

It remains to be seen whether tight market conditions for Group I base oils are here to stay or whether this is just a temporary blip following production issues, but with the refinery maintenance season on the horizon, the first half of 2017 looks as though it could remain tight.

We could therefore be looking at a scenario of robust Group I base oil prices for at least the first half of 2017, with support for higher values also possible, should OPEC's plan to curb crude oil production result in firmer vacuum gasoil (VGO) prices. ■

Sarah Trinder is senior editor, manager, at ICIS, based in the London office, covering base oils, paraffin wax and glycerine/biodiesel

Fertnig/Getty

Supplies of brightstock are flowing more freely in Europe despite plant closures

Crude rise supports US base oil hikes

North American base oil prices were steady in the final quarter of 2016, but the New Year has seen posted price hikes on the back of crude oil's climb

JUDITH TAYLOR HOUSTON

North American posted base oil prices were steady in the final quarter of 2016, exhibiting significantly improved stability compared with price trends seen in the fourth quarter of 2015. Lower volatility in the upstream crude oil markets are the underlying reason for the steadier base oil prices.

But the year end saw price hikes, based on late-2016 crude oil price rises.

Posted prices set the top mark for base oil prices, while contract and market pricing can see wide discounting. Discounts and temporary voluntary allowances (TVAs) did indeed take place during the fourth quarter of last year, driven partly by the typical seasonal slowdown in demand and partially by a few pockets of supply length.

Light grades in Group I and also in Group II tended to experience supply length more than heavy grades. One reason for this is that light and mid-viscosity base oils in Group I and in Group II were often priced at or near parity in the competitive market of 2016.

Where fourth-quarter 2015 was peppered with posted price decreases, fourth-quarter 2016 was notably stable in the posted pricing. Chevron increased its Group II posted prices in August but others did not follow, leaving most posted prices unchanged to the end of the third quarter.

Posted prices were then unchanged until October when Motiva dropped prices on all its posted grades. Phillips 66 raised posted prices on only heavy 600 grade, creating a mixed price perspective.

IMPACT OF CRUDE OIL STABILITY

Benchmark West Texas Intermediate (WTI) crude oil maintained prices in the high-\$40s/bbl range, bumping into the low \$50s/bbl for several weeks in October before achieving \$50s/bbl points in November and December.

By January 2017, \$50s/bbl became the common point for WTI crude. Light Louisiana Sweet (LLS) is a benchmark crude in the US that closely tracks the Brent basket. Both crude oil slates enjoyed the price boost and steadier fundamentals.

Mohamed Messara/EPA/REX/Shutterstock

OPEC's recent decision to curtail oil production has supported prices above \$52/bbl

By mid-January all North American base oil producers had increased posted prices, with 20 cents/gal the common number

The two charts (page 22) show the WTI and the LLS price trends from January 2015 to January 2017, reflecting earlier volatility, and a sample of base oil posted prices alongside WTI (in \$/gal), demonstrating the lower volatility factor in the second half of 2016.

On the strength of crude oil prices consistently in the \$50s/bbl, ExxonMobil recently raised its Group I prices by 20 cents/gal on all grades except brightstock. Brightstock moved up 15 cents/gal. Group II/II+ grades moved up by 20 cents/gal and all price changes were effective 1 January. ExxonMobil does not discuss or confirm its prices. All price moves are made based upon market participant and buyer inputs. Flint Hills Resources (FHR) raised its Group II prices by 10 cents/gal effective 19 December and by mid-January all North American base oil producers had increased posted prices, with 20 cents/gal the common number.

REGULATIONS AND APPROVALS

A number of topical issues in the base oils sector were aired at last year's ICIS Pan American base oil conference in December and the inaugural North American Lubricants congress in September.

Gabe Rhoads from Lubrizol touched upon a topic of great concern to the US industry – regulations and approvals – and pointed out that the US lubricants certification system is far too slow. The certification system used in the US for ushering new technologies and lubricant products into the commercial »

market is a tedious and time-consuming process, he said. He pointed out that certification processes begun in 2012 or even earlier are just emerging into the commercial sector in 2017, adding that often the requirements for certification precede the technology work.

Rhoads went on to give an example of the potential savings that would be made by moving a 0W20 oil quickly into the market – something that has not happened. "About 685m gallons of gasoline could have been saved, along with a reduction in carbon dioxide emissions of about 6m tonnes," he said. "But the system is holding us back and it costs everyone. It just takes too long," Rhoads concluded.

US EXPORTS DOMINATE

Stephen Ames of Ames Consulting pointed out that the US base oil market is heavily reliant on exports in order to maintain domestic supply/demand balance. "About one-third of the sustainable US base oil capacity is exported," Ames said.

With the "big five" refineries operated by ExxonMobil, Motiva, Excel Paralubes and Chevron all located along the US Gulf coast at favourable port locations, exporting US-produced base oils is a prevailing factor for the North American base oil market. "The US can supply Europe at below the European production cash cost," Ames said.

"This does not spell good things for Europe," he added. Ames also pointed out that several changes are expected, with ExxonMobil's Group II addition at Rotterdam slated to start in 2018 and Luberef at Yanbu in 2017 potentially also serving the European market.

Speaking at the lubricants congress, Valentina Serra-Holm, marketing director at Nynas discussed how the use of blends of Group II and naphthenic oils in the formulations for hydraulic oils is shifting higher, along with increased use of Group III paraffinic base stocks.

She pointed out that global Group II and Group III capacity is expected to continue to increase, citing that during 2015 approximately 1.65m tonne/year of new Group II and Group III capacity has been installed. Additionally, Serra-Holm said that another 5m tonnes/year are expected to be added to global capacity in the upcoming two years and more projects are in the planning stage.

The additional capacity holds potential to create an oversupply situation

While these are not US projects, the additional capacity holds potential to create an oversupply situation during this period because demand is not expected to grow at similar rates.

One interesting item Serra-Holm emphasised is that Group I base stocks continue to be the primary base oils for the formulation of industrial lubricants. Given that Group II and Group III base stocks are increasingly needed for passenger vehicles and that Group II is now the predominate base oil produced in the North American market, the fact that Group I remains key to the industrial lubricant sector is of note but not often discussed.

Jeffrey Guevremont, principle scientist, R&D applications group for American Refining Co, discussed performance factors in wind turbines and how lubrication can improve performance in the turbines. The discussion centred about work done in a collaborative effort with other companies such as Novvi and Afton Chemicals that focused on achieving longer life in wind turbines through optimising gear box lubrication and minimising downtime. The efforts also included researching the benefits of using synthetic base oils.

The collaboration and research covered a number of years, with some of the results including evidence that electrical systems showed the highest failure rate while gear box systems caused the longest downtime per failure.

David DeVore of Functional Products discussed greases, pointing out that greases often have a multi-phase structure that includes about 70-90% base fluids in the liquid phase, about 5-25% thickeners in the solid phase and other additives as needed.

DeVore showed that the addition of polymers to the grease can be effective by increasing resistance to shear as measured by Roll Stability (ASTM D1831). ■

Judith Taylor is a senior editor manager in ICIS's Houston, Texas, office. She regularly reports on base oils, paraffins waxes and fatty alcohols

LATIN AMERICA JUDITH TAYLOR HOUSTON

MEXICO REFORMS; SOUTH AMERICA STRUGGLES

THE US view on Mexico is positive for business, with considerable volumes of Gulf Coast-produced base stocks moving into the Mexican market. Mexico is also seeing overall energy reforms move into place as privatisation becomes an option in this key sector, long dominated by the state-owned company, Pemex.

Pemex has only one base oil plant, located at Salamanca, and is a net importer of base oils.

Additionally, with Group I and Group II prices nearing, or at, parity for many grades, considerable volumes of Group II base oils are either crossing the Texas-Mexico border at Brownsville, or entering Mexico via deep-water shipments to Altamira.

In South America, Brazil's flagging economy has dampened the country's base oil requirements. While Brazil was among the top global base stock buyers in 2014, 2016 saw thin shipments to the country.

Petrobras has Group I production capacity in Brazil of about 11,000 bbl/day of base oils. The production utilisation rates are said to be widely reduced but still largely able to meet domestic needs during this time of challenges in the overall economy of the South American giant.

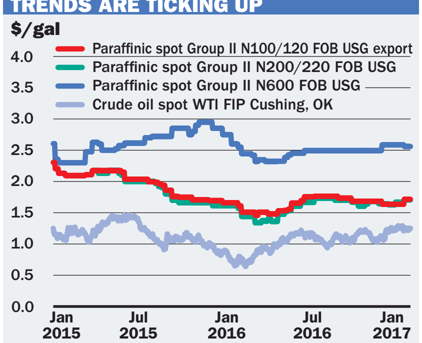
Venezuela has steeply fallen from its position as a significant player in the crude oil market. Alongside this condition, its base oil production – which has production capacity similar to Brazil's – has plummeted.

There is little evidence that any base oil production is taking place in the country.

Large volume base oil shipments have been seen from the US Gulf coast to Venezuela, but coming at wide time intervals that indicate both diminished consumption and challenges in securing terms and payment.

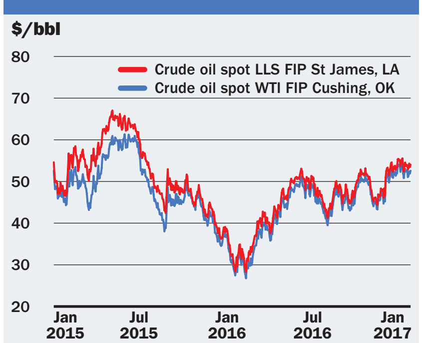
Argentina and Colombia fared more normally during the latter half of 2016 and moving into 2017, with more stability from these South American countries.

NORTH AMERICAN BASE OIL PRICE TRENDS ARE TICKING UP



SOURCE: ICIS

US CRUDE PRICES HAVE BEEN VOLATILE



SOURCE: ICIS

GCC Group II use set to expand

As Group II capacities come on stream in Saudi Arabia and the UAE, the regional market is expected to see an accelerating shift away from Group I

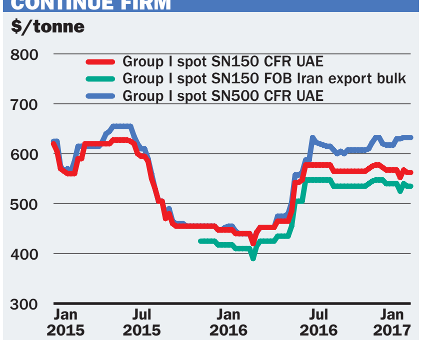
VEENA PATHARE SINGAPORE

Demand for base oils in the Middle East is closely tied to demand for automobiles as automotive lubricants form the major end-use market in the region. The automotive sector, however, has faced the brunt of a difficult economic situation, brought on by the weak macroeconomic environment that has persisted since the crude slump in the second half of 2014.

Sales of new vehicles saw a decline in 2016. Austerity measures put in place, such as removal of subsidies, have resulted in higher fuel prices within the region, curbing consumer spending. Vehicle sales are expected to remain under pressure going into 2017, as the outlook on crude remains pessimistic, despite OPEC's recent move to cut production.

However, the automotive sector in the region looks to be primed for growth in the years ahead, as expanding populations, rising income and disposable income levels and availability of low-cost fuel give rise to an increase in demand for vehicles.

MIDDLE EAST BASE OIL PRICES CONTINUE FIRM



SOURCE: ICIS

Middle East car sales will support regional base oil demand in coming years

Base oils demand is thus also poised for growth in the medium to long term. Some of this growth will come from increased use of Group II and III base oils, rather than today's commonly used Group I.

This move to higher-grade base stocks in the Middle East is being driven by access to the developing regional supply.

Saudi Arabia is poised to become one of the key markets in the region to lead the move to the use of Group II base oils in place of Group I. Regional producer Saudi Aramco Base Oil Company (Luberef) is expected to start up its Group II base oil manufacturing facility at Yanbu in the third quarter of 2017, after civil and contractual delays caused the maker to push back the startup from the second half of 2016.

Talking to ICIS at the sidelines of the Middle East base oils conference in October last year, Luberef said that the company eventually plans to phase out Group I production at the unit and lead the move to migrate its customers to Group II-based formulations.

While the second unit at Jeddah is expected to continue producing Group I base oils in the near to medium term, the company has a long-term plan eventually to move to making only Group II base oils to cater to customers both locally and abroad.

Abu Dhabi National Oil Company (ADNOC), which recently started commercial operations at its Group II/Group III facility in Ruwais, is also looking to increase its presence within the UAE. The company aims to establish retail sales through its distribution arm to supply regional blenders.

The trend towards better quality lubricants in the Middle East has in the past been slower than in most other regions of the world. However, substitution to higher-grade base oils in most countries in the region is emerging and could even accelerate in the near term, as the region reinforces its position as a hub for Group II and Group III production, leading to increased local availability.

2020 AND BEYOND

Industry consultants expect global demand growth for base oils to remain mostly flat until 2020. However, markets such as Asia and the Middle East are expected to grow faster than the global market over the next decade, fuelled by increasing demand for automobiles to cater to the needs of growing populations.

The number of passenger cars in the Gulf Cooperation Council (GCC) region is expected to grow at a compound annual growth rate of 5% and is likely to exceed 13m by 2020.

Moreover, major infrastructure projects and construction ventures in the run-up to upcoming events such as the World Expo 2020 in Dubai and the FIFA World Cup 2022 in Qatar are expected to support increased demand for heavy vehicles to transport goods and manpower, and for logistic activities, thus also supporting base oils demand. ■

Veena Pathare is a senior editor manager with ICIS, based in Singapore. She reports on markets for Middle East base oils and polyolefins

Tight supply gives firm Asian pricing

Asian Group I and II base oil prices remained atypically high in quarter four, on tightness in the market and the prospect of a heavy first-half 2017 maintenance schedule. Group III availability is better, due to new capacity in Abu Dhabi

JASMINE KHOO SINGAPORE
WHITNEY SHI, SHANGHAI

The Asia-Pacific base oils market has recently been experiencing price volatility and tradition-defying trends, especially in the fourth quarter of 2016, on the back of snug spot supply conditions at some regional refiners.

Typically, the Asian market sees price declines in the fourth quarter of each year, especially for heavy grade material such as brightstock. This is mainly brought about by lacklustre demand in the winter season in northeast Asian countries such as China, as the high viscosity nature of heavy grade base oils requires extra caution in transportation use when temperatures fall to zero and below.

Other base oil grades that traditionally experience waning demand in the fourth quarter include Group I SN500 and Group II 500/600N.

However, the fourth quarter of 2016 was vastly different in terms of price movement for heavy grade base oils compared with earlier years. According to ICIS data, spot prices of brightstock registered gains from an average of

Imaginechina/REX/Shutterstock

Expanding Chinese car production and sales are driving growth in the China base oil sector…

$780/tonne FOB Asia in early October 2016 to $805/tonne FOB Asia in late December 2016.

Back in late 2015, the brightstock price decline had been at around 3.3%, with prices coming off from an average of $940/tonne FOB Asia in early October 2015 to $910/tonne FOB Asia on late December 2015, according to ICIS data.

Another heavy grade material, Group II 500/600N, which typically sees price declines in colder seasons, also rose in the fourth quarter of 2016. ICIS data show that spot prices of 500/600N firmed from an average of $650/tonne FOB Asia in early October 2016 to $697.5/tonne FOB Asia in late December 2016.

The main reasons for this price increase was the shortage of Group I and II spot material among regional refiners due to upcoming scheduled shutdown turnarounds and active procurement ahead of the Lunar New Year festivities to stock up on inventories. Limited inventories among regional refiners led them to offer spot lots mostly at premiums month on month, which pushed up assessed prices.

Some buyers also lamented the product scarcity in late 2016, noting that their local contract term volumes were reduced by as much as 50% in some months as refiners grappled with product allocation amid limited stocks. Buyers' attempts to seek spot material also proved futile at times, as refiners maintained that they did not have material for additional spot cargo requests.

Apart from supply conditions, robust upstream trends also exerted upward pressure on spot pricing. Strong WTI crude oil futures, which hovered in the $50s/bbl range in the later part of the fourth quarter of 2016 and early January 2017, also lent upward support to base oils spot prices. Saudi Arabia has cut its crude oil production by at least 486,000 bbl/day since October 2016, in accordance with the OPEC deal agreed in November.

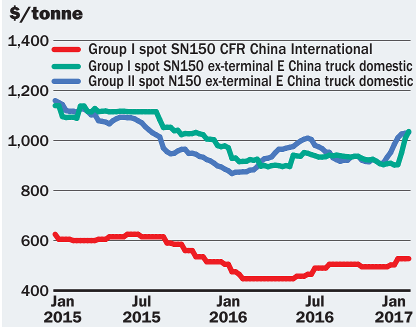
Firm crude oil futures led most sellers to hold on to firm selling indications, citing rising production costs and the need to safeguard margins as their key reasons for price increase.

GROUP III IN BETTER SUPPLY

In the Group III market, supply conditions were significantly different from the Group I and II sector. Following the start-up of Abu Dhabi National Oil Company (ADNOC)'s 500,000 tonnes/year Group III and 100,000 tonnes/year Group II base oils unit in Ruwais in 2016, increased availability of Group III 4 and 6cst cargoes of Middle East origin has posed increasingly stiff competition to the Asian-origin Group III base oils sector.

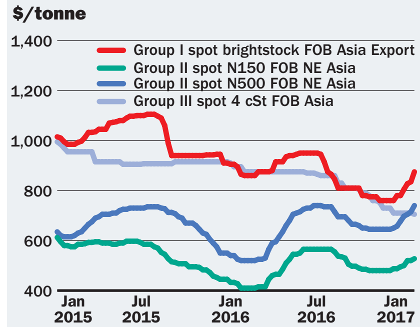
The Asian Group III market saw a dilution of the earlier monopoly by Asian Group III refiners, as Middle East origin 4 and 6cst cargoes started making their way into key import markets such as India, China and even parts of Southeast Asia.

CHINA BASE OIL PRICES TRENDED UP AT THE END OF 2016



SOURCE: ICIS

ASIA BASE OIL PRICES PICKED UP AT THE END OF 2016



SOURCE: ICIS

With the increased availability of Middle East-origin Group III spot material in both bulk and flexi-bag packaging at competitive prices, reduced dependence on Asian-origin Group III material was observed among Asia-based importers.

This in turn led some Group III sellers to drop offers in order to stimulate cargo uptake among Asian buyers, which led to price decline for Group III Asian material.

According to ICIS data, Group III 4cst spot prices fell from an average of $790/tonne FOB Asia in early October to $710/tonne FOB Asia in late December 2016. Group III 6cst cargoes, which were bundled and sold with 4cst material, also saw price decline.

Local contract term volumes were reduced by as much as 50% in some months as refiners grappled with product allocation amid limited stocks

Going forward, spot prices of Group I and II base oils are poised to receive support in the first half of the year on the back of a spate of upcoming scheduled shutdown maintenance projects among regional Group I and II refiners, which would in turn result in curtailed spot availability. Some refiners, especially those who make Group II 500/600N, say that they will be sitting on scarce inventories until April or even May.

Heavy term contract commitments among refiners also cut their spot cargo allocation, which is expected to result in stiff competition for material among traders and end users. As a result, some market players expressed expectations of persistent upward pressure on spot prices for Group I and II cargoes in the first half of 2017.

Early negotiations for February 2017 shipment cargoes were already showing signs of price gains compared with January, which reinforced some market players' opinions of an extended price uptrend.

However, some market participants were less optimistic, adding that Group I and II base oils price trends ultimately depend on other factors such as upstream crude conditions as well as economic conditions in key import markets.

For the Group III base oils sector, spot prices of northeast Asian 4 and 6cst cargoes could potentially come under further downward pressure amid the increasing prevalence of competitively-priced 4 and 6cst cargoes of Middle East origin in Asian import markets.

ROBUST DEMAND IN CHINA

In the important Chinese market, Group II and Group III base oils demand is expected to be promoted by the robust demand from vehicle use lubricants in 2017. In contrast, demand for Group I and off-spec base oils in China will be stable-to-soft, driven by the sluggish demand from industrial lubricants due to the economic slowdown in China.

The country's GDP growth is expected to decelerate to 6.4% in 2017 from 6.6% in 2016. In general, China's overall base oil and lubricant demand are both expected to rise at low levels of 1-2% in 2017 in line with the healthy demand from vehicle use lubricants but bearish demand from industrial lubricants.

Demand for vehicle use lubricants will remain a significant growth element for demand in lube oil consumption in China, pushed up by the rising car output and sales in 2017. According to data from the China Association of Automobile Manufacturers, Chinese vehicles output volume in 2016 was about 28.11m and sales volume was about 28.02m, up by 14.46% and 13.65% from 2015, respectively.

Production and sales of passenger cars climbed to 24.42m and 24.37m, respectively, recording accelerated growth of 15.50% and 14.93% due to the fact that government policy cutting the purchase tax on passenger cars below 1.6 litres by half was due to stop at the end of 2016.

Production and sales of commercial vehicles rose by 8.01% and 5.80% year-on-year, to 3.698m and 3.651m, respectively. Output and »

» sales of commercial vehicles stopped declining because of recovering demand.

With the government reducing the discounts on the purchase tax of passenger cars in 2017 and cancelling the discounts on the purchase tax in 2018, the rising pace of Chinese vehicles output and sales volume will slow slightly, but demand for vehicle use lubricants in China is expected to follow a slightly increasing trend in 2017.

Industrial lubricant demand is expected to be sluggish in 2017 due to the economic slowdown and the elimination of overcapacity in the iron and steel industry, as required by the State Council's decree. According to the decree, China plans to reduce the production capacity of crude steel by 100-150m tonnes/year in the five years starting from 2016.

STEEL OUTPUT STILL RISING

According to the National Bureau of Statistics, crude steel production in the first 11 months of 2016 was 738.93m tonnes, up by 1.1% from 2015. At the same time, iron production was 643.26m tonnes and rolled steel production was 1043.44m tonnes, up respectively by 0.4% and by 2.4%.

Despite of the slight rise of steel, iron and rolled steel production in 2016, other industry fields were still in a bearish situation, which led industrial lubricant demand to be slightly lower in 2016. Generally speaking, industrial lubricant demand will continue to decrease in view of the economic slowdown and the implementation of the steel capacity reduction plan in 2017 to 2020.

Chinese base oils apparent consumption is expected to rise by 1.34% year-on-year to 7.88m tonnes/year in 2017 due to the stronger demand for lubricants used in petrol and diesel engines, despite the slightly sluggish demand for industrial lubricants.

The market share of Group II base oils apparent consumption is forecast to increase by 2 percentage points to 43% in 2017, driven in part by the fact that some prices are likely to fall below those of Group I base oils due to the increasing supply glut as well as the firm demand of vehicle use lubricants.

In addition, apparent consumption of Group III and above grades is likely to account for a larger share of the market in 2017, at 8.6%, with the support of stabilised operation at Sinopec Maoming Petrochemical's Group III plant and continuous Middle East Group III base oils imports, which are expected to enter the Chinese market at lower prices.

However, Group I grades demand share will be stable at 24% because some of the lubricant companies and additive producers are committed to using Group I base oils, providing firm demand from end-users, despite the fact that some other lubricant companies have switched the formula from Group I to Group II grades.

ImagineChina/Rex/Shutterstock

...but cut backs in steel production will hit industrial base oil demand

The share of off-spec base oils demand is expected to shrink further due to significantly lower demand for low-end base oils, as lubricant producers will keep upgrading their products and the weak demand of the industrial lubricant sector.

Turning to the supply side, there will be an intensive schedule of maintenance at Group I and Group II base oil plants in the first half of 2017, both in Asia and China. Besides this, there are no new Group I and Group II base oils plants scheduled to come onstream in China in 2017, apart from a 300,000 tonne/year Group III plant expected at the end of 2017.

There will be an intensive schedule of maintenance at Group I and Group II base oil plants in the first half of 2017, both in Asia and China

Therefore, supply of Group I and Group II base oils in the first half of 2017 will be tight.

Looking at the Group I base oils supply situation, PetroChina subsidiary Fushun Petrochemical shut down its 260,000 tonne/year Group I plant from late 2014 and has decided not to restart the plant in the first half of 2017 due to poor margins. PetroChina subsidiary Daqing Petrochemical shut down its 250,000 tonne/year Group I base oil plant from September 2016 to April 2017.

PetroChina subsidiary Dalian Petrochemical plans to have regular maintenance of its 450,000 tonne/year Group I plant from end March to mid-May in 2017. Therefore, PetroChina refiners will have limited Group I base oils to offer to the domestic market in the first half of 2017.

At Sinopec, Group I supplies are also tight, as most of its product is being used for in-house inner lubricant production. It has also permanently shut down its Yanshan Group I plant. Thus Sinopec Group I refiners will have tight supplies to the domestic market.

Asian refiner Thailand IRPC will shut down its Group I unit from February to end March, which will lead to the tight supply of Group I BS150.

In the Group II base oil market, supplies of high-viscosity grade will be tight in the first half of the year in response to the intensive planned maintenances of Group II plants at Asian refiners. Among of these, GS-Caltex will have regular maintenance of its 1.3m tonne/year Group II and III plant from March to April to change its catalyst. ExxonMobil will have the maintenance of its 1.6m tonne/year Group II unit from March to the mid-April. SK Lubricants will also have scheduled maintenance of its 300,000 tonne/year Group II unit during May to June.

Asian Group II units also plan to undertake maintenance in the first half of the year and mainly produce high-viscosity Group II. On the demand side, the peak season for high-viscosity Group II base oils is March to May. Therefore, there may be a shortage of high-viscosity grades to support prices trend in China.

Chinese local refiners, Sinopec Jinan Petrochemical and Hainan Handi Sunshine, will have maintenance in February and October, respectively, which will last two to three months.

In Group III, the major Asian refiners will not be undertaking regular maintenance this year and Sinopec Maoming Petrochemical will operate without maintenance on its plant. With more Middle East Group III hitting the Chinese market, at much lower prices, supplies of Group III will increase in 2017. ■

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ICIS Surfactants Awards

Hyatt Regency Jersey City, USA // May 18, 2017

Designed to recognise excellence and innovation – Nominations for the **ICIS Surfactants Awards will close Friday 24 February!**

ICIS Surfactants Awards will be taking place for the first time this year on the 18 May as part of the World Surfactants Conference in New Jersey. Designed to honour excellence, innovation and outstanding achievement, winners will be recognised in a ceremony at the end of conference day one.

Nominations and entries are for the following awards categories:

Product innovation
For the development of a new and worthwhile product.

Technology innovation
For the development of a new technology or technological solution.

Sustainability
For a contribution in the field of sustainability, either a product, process or supply chain.

Partnership
For the delivery of an excellent business partnership.

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For the surfactant user that is a true pleasure to deal with.

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For a high-achieving industry newcomer.

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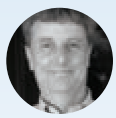
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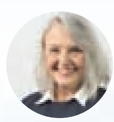
Judith Taylor, **ICIS**

All nominations & entries need to be submitted by 24 February.
For more information please visit: **www.icisconference.com/worldsurfactants17/awards**

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EVENTS

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ICIS is excited to announce that this year's PET Value Chain conference and R-PET Forum will take place at The Kempinski Hotel Bristol, Berlin on 7-8 March. This is a brand new venue, with an excellent, central location. Book your place now to meet PET industry leaders, discuss issues such as global supply and demand, macroeconomic factors, anti-dumping and sustainability issues in the sector's most comprehensive event. We are extremely honoured to have the likes of Indorama, GSI Global International, Heineken and Reliance Industries on the agenda. Visit www.icisconference.com/petvaluechain

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PET Value Chain: Utilising Greater Global Connectivity
7-8 March
Kempinski Hotel Bristol Berlin, Berlin, Germany
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The 12th ICIS World Olefins Conference
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The 5th Indian Base Oils & Lubricants Conference
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Email saniya.maralova@rbi.co.uk
www.icisconference.com/indianbaseoils2017

The 6th ICIS World Polyolefins Conference
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13-14 February

Fundamentals of Petrochemical Plant Economics & Forecasting
15 February

Fundamentals of the Polymers Business
16-17 February
Hotel NH Amsterdam Museum Quarter, Amsterdam, The Netherlands

Fundamentals of the Base Oil Business
13 February

Base Oils – Product Quality and Global Profitability
14 February
Park Plaza Westminster Bridge Hotel, London, UK

Advanced Purchasing Skills
22-23 February, Amsterdam, The Netherlands

Petrochemicals – An In-Depth Introduction
13-14 March

Fundamentals of Petrochemical Plant Economics & Forecasting
15 March

Fundamentals of the Polymers Business
16-17 March, Houston, US

Petrochemicals – An In-Depth Introduction
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ASIA PETROCHEMICAL INDUSTRY CONFERENCE 2017

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For more details, contact Kentaro Yamaguchi at JPCA
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TRISHA HUANG PROFILE LAST PUBLISHED 25 SEPTEMBER 2015

Acetone

USES

Acetone is used in two main applications: the manufacture of methyl methacrylate (MMA) and bisphenol A (BPA). Acetone also goes into solvent applications largely used in pharmaceuticals manufacturing and is used to make a number of chemical intermediates, such as methyl isobutyl ketone (MIBK), isophorone and diacetone alcohol/hexylene glycol.

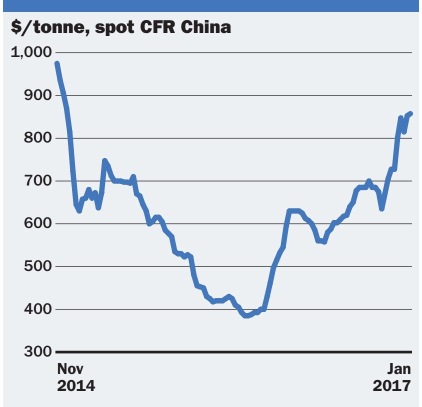
SUPPLY/DEMAND

The existing acetone supply overhang in Asia is expected to worsen in 2017 as the region's capacity expansion outpaces the growth in demand. 2016 saw the commissioning of two new phenol/acetone plants in Asia: Thailand's PTT Phenol and South Korea's Kumho P&B each started up a new plant, adding 335,000 tonnes/year to Asian acetone capacity.

Asia, which already has just over half of the world's acetone capacity, will see further capacity increase in 2017. The anticipated commissioning of two new phenol/acetone plants is set to boost the region's acetone capacity by a further 6.5% to 4.12 million tonnes by end 2017.

Following a pause in capacity addition in 2016, capacity in China is set to increase in the second half of 2017 as CNOOC and Shell Petrochemicals Co (CSPC) starts up a new phenol plant with a capacity to produce 130,000 tonnes/year of acetone. The construction of Deepak Phenolics' new phenol plant, India's largest, is expected to be completed in the final quarter of 2017. The plant will be able to produce 120,000 tonnes/year of acetone.

ASIA ACETONE



Further afield, Petro Rabigh's new phenol plant in Rabigh, Saudi Arabia is expected to add a further 150,000 tonnes/year of acetone to an already saturated market in the second half of 2017. The three new plants will add to the length in supply even as Asian producers are already grappling with excess capacity and weak margins for primary product phenol.

PRICES

A spate of production issues in 2016, weak primary product phenol prices relative to raw material benzene and sturdy supply/demand fundamentals for the by-product drove acetone prices to a 25-month high of $857.50/tonne CFR China in January 2017. The prices into China, Asia's biggest spot market, more than doubled in the space of 12 months.

In January 2016, spot acetone prices sank to a 14-year low average of $385/tonne CFR China, following the commissioning of three new phenol/acetone plants in China in 2015. However, a heavy phenol/acetone plant turnaround schedule and a string of accidents in 2016, and a pick-up in Americas demand for Asian material in the second half of the year set the stage for acetone to make a comeback.

Shell's two force majeures on base chemical supplies from its Pulau Bukom cracker complex crimped the phenol/acetone output by Mitsui Phenols Singapore and Changshu Changchun Chemical for most of 2016.

The commissioning of Thai producer PTT Phenol's new unit, "PTT Phenol II", had been postponed from late 2015 to May 2016. PTT Phenol's plant operations were subsequently disrupted in August by an explosion and fire at a waste water tank.

TECHNOLOGY

Nearly 90% of acetone is produced from cumene, from which phenol is also produced, which itself is made by the reaction of propylene and benzene in a phosphoric acid-based or zeolite catalyst. About 0.62 tonnes of acetone is produced with each tonne of phenol made.

OUTLOOK

China's acetone import demand in 2016 bucked the trend of yearly declines since 2010. Inbound shipments up to November 2016 exceeded the volume imported in the first 11 months of 2015, bolstered by the growth in acetone-based MMA capacity in China. However, demand growth for acetone is expected to again lag the gain in supply in 2017.

In the downstream BPA sector, only Covestro is expected to bring onstream a new 110,000 tonne/year line in China in the first quarter of 2017. Despite expanding acetone supply, none of the new MMA plants scheduled for commissioning in 2017 are designed to use acetone as a feedstock.

In China, Shandong Yidali and Dongming Huayi New Materials' new MMA plants will use the C4 process, through the direct oxidation of iso-butylene. Mitsubishi Rayon Co, parent company of MMA major Lucite International, plans to start up a 250,000 tonne/year MMA plant in mid-2017 in partnership with Saudi Arabia's SABIC. The plant will use the company's highly productive Alpha process. ■

ASIA ACETONE CAPACITY*
'000 TONNES/YEAR

Company	Location	Capacity
Formosa Chemicals & Fibre	Mailiao, Taiwan	250
Taiwan Prosperity Chemical	Lin Yuan, Taiwan	220
Mitsui Phenols Singapore	Pulau Sakra, Singapore	188
Chang Chun Plastics	Kaohsiung, Taiwan	186
LG Chem	Yeosu, South Korea	180
LG Chem	Daesan, South Korea	180
Kumho P&B no. 4	Yeosu, South Korea	180
Formosa Chemicals & Fibre	Ningbo, China	180
Changshu Changchun Chemical	Changshu, China	180
PTT Phenol II	Map Ta Phut, Thailand	155
PTT Phenol	Map Ta Phut, Thailand	154
Kumho P&B no. 3	Yeosu, South Korea	150
Shanghai Sinopec Mitsui	Caojing, Shanghai, China	150
CEPSA Chemical (Shanghai)	Caojing, Shanghai, China	150
Mitsubishi Chemical	Kashima, Japan	150

*Top 15 plants by capacity

JUDITH TAYLOR FIRST US PROFILE

Base oils

USES

Base oils are the main component of finished lubricants. Base oils are derived from heavy crude oil fractions in vacuum distillation.

Base stocks are refined to impart physical and chemical properties that produce effective lubricant performance characteristics required by the various types of end-use oils and lubricants.

Passenger car motor oils (PCMOs) are the largest segment, with heavy-duty motor oil (HDMO) comprising another key segment.

Various amounts of chemical additives combine with the base oil in order to produce different types of finished lubricants.

SUPPLY/DEMAND

US Gulf Coast base oil production is dominated by Group II base oils, as Chevron's 2014 start-up of its Pascagoula, Mississippi, base oil plant added 25,000 bbls/day of Group II production to North American output.

North America produces approximately 275,000 bbl/day of base oils, including Group I, Group II and Group II+. Group III base oils are almost all imported.

The North American market was largely in supply/demand balance during 2016, maintained by significant export activity.

The US is a key net exporter of Group II base oils, with large contracted volumes going to Europe and South America.

US domestic demand was mostly steady in 2016. Domestic demand is more subdued in the fourth quarter than in others.

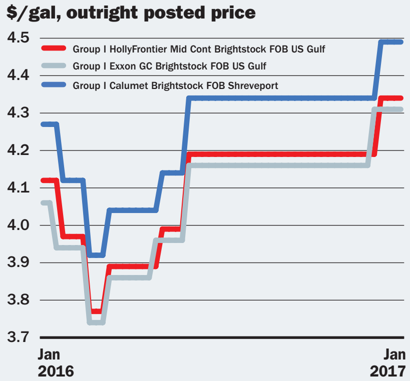
US Gulf Coast refineries send significant base oil volumes into Mexico. Mexican demand can fluctuate considerably based upon regional economics and production by the single base oil producer in the country – Pemex.

South America is a huge net importer of base oils, with minimal regional production in any of the continent's countries.

There are 12 independent countries and three dependent territories in South America, with Brazil as the largest country both geographically and in terms of economy.

US BASE OILS

$/gal, outright posted price



PRICES

US base oil prices stabilised in 2016 compared with 2015 as crude oil prices moved up from benchmark lows. US base oil pricing is broadly determined by producers' posted prices from which discounting is applied to form market and contract prices.

US base oil market prices are stabilising following posted price increases in January. Group I, II and Group III market spreads are unchanged on steady business, according to the Americas Base Oil report on 7 February.

In exports, Group II ranges were assessed as mixed, with the light and mid viscosities moving higher and the heavy vis 600 grade adjusted down on market input.

Crude oil is a key market driver for base oil prices along with the cost of feedstock vacuum gas oil (VGO). US base oil margins improved in 2016 on oil price stabilisation that provided producers the opportunity to review positions for increases moving into 2017.

TECHNOLOGY

Group I base oils are made by a solvent extraction process that removes aromatic compounds and waxes.

Group I base oil production is the only source of the heavy grade brightstock base oil and paraffin waxes.

Group II, Group II+ and Group III are light viscosity base oils produced by a hydroprocessing technology.

Polyalphaolefins (PAOs) are produced from a decene olefin feedstock and are considered synthetic base stocks.

The lighter viscosity base oils are increasingly dominant in passenger car motor oils and other lubricant applications because of regulatory and environmental stipulations.

US BASE OILS SITES

Company	Location
ExxonMobil	US Gulf Coast
HollyFrontier	Mid-Continent
Paulsboro Refining	US East Coast
Calumet	US Gulf Coast
Phillips 66	US Gulf Coast
Motiva	US Gulf Coast
Chevron	US Gulf Coast
Flint Hills Resources	US Gulf Coast
Kleen Performance	Ilinois

OUTLOOK

The Americas base oil market continues to work to meet the regulatory changes fostered by stipulations from the Environmental Protection Agency (EPA) that have dominated the industry for several years.

The base oils and lubricants industry is working to improve carbon emissions controls and other EPA requirements while fulfilling the need to maintain lubricant performance.

In 2017, many testing programmes and initiatives will enter the commercial phase, mainly for lubricants used in passenger cars. Testing programmes are also underway for heavy duty vehicles.

The combined work in both vehicle sectors is pushing the base oil side of the industry toward lighter viscosity, premium base stocks Group II, II+ and Group III. Group II base oils are the prevalent passenger car base oils in the Americas, surpassing the typically heavier grade Group I from 2014 onwards. Evolving needs for higher performance, lighter viscosity base oils are bringing Group II+, Group III and PAOs to the forefront.

In 2017 the progress toward light viscosity base oils in Group II and Group III is expected to continue amid expectations that changes wrought by regulatory requirements are impacting the commercial marketplace for motor oils and lubricants. ■

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